Boston Transit Commission.

Seventeenth Annual Report.

June 30, 1911

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SEVENTEENTH ANNUAL REPORT

OF THE

BOSTON TRANSIT COMMISSION,

FOR THE YEAR ENDING

JUNE 30, 1911.

CITY OF BOSTON
PRINTING DEPARTMENT
1911

ALLIED PRINTING
TRADES UNION LABEL COUNCIL
BOSTON MASS

BOSTON TRANSIT COMMISSION.

15 Beacon Street, Boston, June 30, 1911.

To the City Council of the City of Boston:

In compliance with Statutes of 1894, chapter 548, section 24, the report of the Boston Transit Commission for the year ending June 30, 1911, is respectfully submitted.

Cambridge Connection.

Good progress has been made during the year in the construction of the tunnel under Beacon Hill for the Cambridge Connection. Section 1, Patrick McGovern, contractor, was substantially completed April 11, 1911, and the Chief Engineer reports that the construction contract for Section 2, Coleman Brothers, contractors, will probably be completed about September 1, 1911.

Real Estate Takings.

The requisite easements have been taken under property on Beacon Hill, and awards have been made of the land damages. In most of these cases, the tunnel is at a considerable distance below the surface. Satisfactory progress has been made in effecting settlements.

Elevators at Park Street Station.

The depth of the Park street station below the surface renders desirable the use of some form of elevator at two of the exits. The character and the amount of the traffic to be handled requires that some form of the endless, continually moving, inclined elevator should be used. There are two types of such elevators, one known as the Reno inclined elevator and the other the Otis escalator, the former being that which is installed in the State station of the Washington street tunnel. Bids were obtained from both companies, and after consideration of all the facts, and a study of the advantages and disadvantages of the two types, the Commission decided to install the Reno inclined elevator at the northerly exit and the Otis escalator at the southerly exit, on the east side of Tremont street.

WASHINGTON STREET TUNNEL.

Settlements for real estate or rights or interests therein taken by the Commission have been made with the following estates:

July 23, 1910, Thompson estate, 106 Union street.
August 5, 1910, Pitkin estate, 102 Union street.
November 17, 1910, Richards estate, 108–110 Union street.
June 15, 1911, Anna P. Rogers, 245–249 Washington street.

In the Sixteenth Annual Report of the Commission, pages 12 and 13, the terms were given of an agreement which had been entered into with the Business Real Estate Trust for the purchase of the Salisbury estate, on the corner of Washington and Summer streets. The Trust did not avail itself of the option given by this agreement and subsequently under date of July 29, 1910, a new agreement (See Appendix A), was made similar in terms and approved by the Boston Elevated Railway Company, as a result of which the Trustees paid to the city $290,000 on July 29, 1910, and on June 1, 1911, $270,000, less $9,000 allowance for interest on the previous payment. On the last named date the property was transferred to the Trust.

In consequence of a taking from the Old South Association the Commission on April 9th, 1907, made an award of $100,000 as damages, which sum was tendered to the Association under Chapter 317 of the Acts of 1904 and was accepted by the Association as payment *pro tanto*. The Association being dissatisfied with the award filed a petition in the Superior Court to recover its damages. The case was tried in April, 1911, and the jury returned a verdict fixing the damages at $100,000, whereupon the Court ordered a verdict for the defendant, said sum having already been paid the Association as the award of the Commission. The case may be carried to the Supreme Judicial Court by the Association.

TREMONT STREET SUBWAY.

Various minor changes intended to facilitate the operation of cars have been made in the Tremont street subway by the Boston Elevated Railway Company with the assent of the Commission. The operating length of the platforms at Park street has been increased so as to accommodate eight cars at one time, but as a result the southerly end of the south-bound platform is much crowded. In the report to the Legislature, on chapter 58, Resolves of 1910, (West End Loop, so-called),

made by this Commission, sitting jointly with the Board of Railroad Commissioners, the following statement was made with reference to this matter.

"In this connection the Joint Board, in view of the present congestion in the Park street station at rush hours, deems it proper to state that existing accommodations can readily be increased to such extent as may be desired by extending the platforms towards the south. This station was originally planned to occupy in width as much space under the Common as was permitted by law, and its length was determined by an estimate of the area required for probable business and by a desire to avoid injury to a line of old elms then supposed to be in good condition, but shortly thereafter discovered to have been so rotted by age that safety required their removal. An enlargement of the station, if desired, can now be executed advantageously in connection with the building of the new station for the Cambridge line. Such enlargement will require special legislative authorization, and the assent of the West End Street Railway Company as lessee and of the Boston Elevated Railway Company as assignee of the lease will also be necessary. It should be borne in mind that the present congestion will in any event be materially relieved when the new subway line to Cambridge is opened, and later when the proposed Riverbank subway to the west is constructed, as each of these subways will have independent platforms, entrances and exits."

RIVERBANK SUBWAY.

November 3, 1910, the Commission voted that stations on the Riverbank subway should be located at Massachusetts avenue, Dartmouth street and Charles street. From this decision the Boston Elevated Railway Company appealed to the Board of Railroad Commissioners whose opinion was rendered thereon January 21, 1911, affirming the decision of the Commission.

The Boston Elevated Railway Company having accepted chapter 579 of the Acts of 1910, permitting the Commission to reopen the question as to the location of the westerly terminal of the Riverbank subway, hearings were given, as required by the Act, on July 27 and September 2, 1910. On October 4 the Commission voted that it was inexpedient to alter the location previously fixed for the westerly terminal. The work of construction upon the Riverbank subway, however, according to the statute, could not be begun until the lease for the same had been executed by the Boston Elevated Railway Company. A draft of this lease had been sent to the company on April 22, 1910. In the meantime a movement had been begun in favor of the abandonment of the location of the Riverbank subway authorized by chapter 573 of the Acts of 1907, and the substi-

tution therefor of a route under or near Boylston street. This matter, by chapter 43 of the Resolves of 1911, passed April 6, 1911 (Appendix B), was referred to the Commission, sitting jointly with the Board of Railroad Commissioners, and in the report of this Joint Board, submitted to the Legislature May 1, 1911, such substitution was recommended. This report, with a dissenting opinion, will be found in Appendix C.

ELEVATED STRUCTURE IN CHARLESTOWN.

Chapter 52 of the Resolves of 1911 (see Appendix D) required the Commission to submit with the present report an estimate of the cost of removing the elevated structure between the North station and Sullivan square and the substitution therefor of a subway.

The Resolve did not appropriate any funds to be expended for this purpose, and the Commission had no funds available, and could not, therefore, incur any expense.

The Commission, however, requested its Chief Engineer to prepare an estimate, and his report is as follows:

BOSTON TRANSIT COMMISSION,
15 BEACON STREET, BOSTON, June 30, 1911.

To the Boston Transit Commission:

GENTLEMEN:— It is estimated that the approximate cost of a two-track tunnel and subway from the North Station, Boston, to Sullivan square, Charlestown, to replace the present elevated structure would be as follows:

Causeway street station, 20,000 square feet at $15 . .	$300,000 00
Changes between Haymarket square and Causeway street station, 500 feet at $340	170,000 00
2,000 feet of tunnel from Causeway street to Front street, Charlestown, at $350	700,000 00
Two stations near Washington street and Thompson square, Charlestown, 40,000 square feet at $15 . .	600,000 00
1,000 feet of tunnel between Front street and Austin street, Charlestown, at $324	324,000 00
4,300 feet of subway between Austin street and Sullivan square, Charlestown, at $420	1,806,000 00
Station and changes at Sullivan square	840,000 00
	$4,740,000 00

The route is from the present Washington street tunnel incline north of Haymarket square, northerly under the Charles river just east of the North Station and west of Warren bridge to the junction of Front and Jenner streets, Charlestown; thence a tunnel approximately under Jenner

and Harvard streets to Thompson square; and from there a subway following Main street to Sullivan square. Land damages are not included in the estimate. The salvage on the present elevated structure would probably be a few thousand dollars more than the cost of removing it, but anything thus realized would be a very small percentage of the total cost of the change. With this arrangement it is assumed that all trains over the Atlantic avenue elevated line would run around to the North Station, all passengers for the north transferring to the new subway at this point. At Sullivan square, in order to avoid the use of stairways for passengers transferring between the subway trains and surface cars, it would be necessary to depress the present surface car approach tracks to the station.

Yours truly,

EDMUND S. DAVIS,
Chief Engineer.

LEGISLATION.

In addition to the regular work of the Commission a large amount of time has been devoted to matters which have been referred by the Legislature to Joint Boards in which the Commission has been included, and of which brief mention may here be made.

The members of the Commission have sat as members of the Joint Board on Metropolitan Improvements, appointed by chapter 113 of the Resolves of 1909. This Joint Board submitted a preliminary report January 1, 1910, and its final report December 31, 1910.

The Legislature of 1910 referred to a double joint board, consisting of the Board of Railroad Commissioners and this Commission, the following resolves, viz.:

Chapter 58, relating to the West End Loop, so-called;
chapter 94, relating to a tunnel or subway to the South Station;
chapter 97, relating to a tunnel or subway to Dorchester;
and chapter 139, relating to various matters concerning the Boston Elevated Railway Company, the West End Street Railway Company, the subway leases, etc.

The reports on these subjects will be found in Appendixes E, F, G, H.

The Legislature of the current year by Resolve, chapter 38, (Appendix I) referred to the same double joint board the matter of a teaming tunnel to East Boston. This report will be found in Appendix J.

By an order of the House of Representatives the Joint Board considered the question of traffic in Chelsea and vicinity, and its report thereon will be found in Appendix K.

Chapter 108 of the Resolves of the current year refers to this Joint Board, for report to the Legislature of 1912, the consideration of the enlargement of the Park street station of the Tremont street subway, the removal of the present subway structures in Scollay square and Court street and the substitution of others therefor, and two bills with reference to passenger and freight transportation, both by railroads and street railways in Boston, Quincy, Milton and Hyde Park. This Resolve will be found in Appendix L.

EAST BOSTON TUNNEL.

Atlantic Avenue Elevators.

Prior to the completion of the East Boston tunnel a question arose as to whether the elevators and machinery therefor, in the Atlantic avenue station, were to be considered a part of the construction, to be furnished by the city, or a part of the equipment, to be provided by the Boston Elevated Railway Company. As the question could not be judicially determined before the elevators would be needed, it was agreed that the city of Boston should install them, without prejudice to its claim that they formed a part of the equipment and that they should be furnished by the company. Subsequently suit was brought by the city of Boston to recover this cost and on June 14th, 1911, a verdict of $51,612.52 was rendered in favor of the city. The case may be taken to the Supreme Judicial Court by the company.

Toll Receipts.

The following is a statement of the receipts from tolls and the cost of collection of the same for the year ending June 30, 1911:

July 1, 1910, to July 31, 1910:		
Receipts	$11,174 52	
Cost	1,487 13	
		$9,687 39
August 1, 1910, to October 31, 1910:		
Receipts	$34,986 30	
Cost	4,778 94	
		30,207 36
November 1, 1910, to January 31, 1911:		
Receipts	$36,083 69	
Cost	5,079 36	
		31,004 33
Carried forward		$70,899 08

Brought forward		$70,899 08
February 1, 1911, to April 30, 1911:		
Receipts	$34,429 04	
Cost	4,888 91	
		29,540 13
May 1, 1911, to June 30, 1911:		
Receipts	$24,630 47	
Cost	3,310 61	
		21,319 86
Total		$121,759 07

TERM OF THE COMMISSION.

By chapter 623 of the acts of the Legislature of the year 1911 the term of the Commission and of its members, which otherwise would have expired at the date of this report, was extended for three years. (See Appendix M.)

THE CHIEF ENGINEER.

February 16, 1911, Edmund S. Davis, who had been Acting Chief Engineer of the Commission since the retirement of Howard A. Carson, was appointed Chief Engineer, the appointment to take effect as of February 1.

SINKING FUNDS.

The following is the condition of the debt and of the sinking funds for the various divisions of the work of the Commission at the date of this report, as stated by the City Treasurer:

SUBWAY (INCLUDING ALTERATIONS).

(*Debt,* $4,416,000, *outside debt limit.*)

Amount of fund, July 1, 1910		$1,233,809 40
Interest on bank deposits, July 1, 1910, to date	$1,373 49	
Interest on investments, July 1, 1910, to date	43,115 00	
Revenue, etc., July 1, 1910, to date	51,945 00	
Appreciation of investments, July 1, 1910, to date	3,948 80	
		100,382 29
		$1,334,191 69
Interest on investments purchased, July 1, 1910, to date	$147 72	
Premium on investments purchased, July 1, 1910, to date	46 80	
		194 52
		$1,333,997 17

CHARLESTOWN BRIDGE, No. 1.

(*Debt*, $750,000, *inside debt limit.*)

Amount of fund, July 1, 1910		$174,774 26
Interest on bank deposits, July 1, 1910, to date	$982 51	
Interest on investments, July 1, 1910, to date	5,155 00	
Requirement for debt	7,904 00	
		14,041 51
		$188,815 77

CHARLESTOWN BRIDGE, No. 2.

(*Debt*, $805,000, *outside debt limit.*)

Amount of fund, July 1, 1910		$207,064 96
Interest on bank deposits, July 1, 1910, to date	$1,195 94	
Interest on investments, July 1, 1910, to date	5,611 00	
Requirement for debt	6,109 00	
Revenue, etc., July 1, 1910, to date	1,702 06	
		14,618 00
		$221,682 96

EAST BOSTON TUNNEL.

(*Debt*, $3,193,000, *outside debt limit.*)

Amount of fund, July 1, 1910		$305,394 68
Interest on bank deposits, July 1, 1910, to date	$1,215 44	
Interest on investments, July 1, 1910, to date	10,260 00	
Revenue, etc., July 1, 1910, to date	66,630 67	
		78,106 11
		$383,500 79

BOSTON TUNNEL AND SUBWAY.

(Washington Street Tunnel.)

(*Debt*, $8,490,700, *outside debt limit. Sinking Fund*, $8,256,700. *Serial*, $234,000.)

Amount of fund, July 1, 1910		$374,710 19
Interest on bank deposits, July 1, 1910, to date	$2,125 19	
Interest on investments, July 1, 1910, to date	12,657 00	
Revenue, etc., July 1, 1910, to date	117,158 50	
		131,940 69
		$506,650 88
Interest on investments purchased, July 1, 1910, to date	$34 00	
Premium on investments purchased, July 1, 1910, to date	328 50	
		362 50
		$506,288 38

RAPID TRANSIT — CAMBRIDGE CONNECTION.

(*Debt*, $850,000, *outside debt limit.*)

Amount of fund, July 1, 1910		$10,909 55
Interest on bank deposits, July 1, 1910, to date	$303 57	
Premium on loans negotiated, July 1, 1910, to date	1,345 00	
		1,648 57
		$12,558 12

RIVERBANK SUBWAY.

(*Debt*, $505,000, *outside debt limit.*)

Amount of fund, July 1, 1910		
Interest on bank deposits, July 1, 1910, to date	$33 81	
Premium on loans negotiated, July 1, 1910, to date	1,345 00	
		$1,378 81

AMOUNTS PAID FOR RENTAL OF THE SUBWAY.

The following sums have been paid during the year by the Boston Elevated Railway Company for the use of the subway:

Sept. 30, 1910:		
Net cost of subway	$4,100,915 79	
One quarter's rental		$49,979 91
Alterations: net cost	242,673 93	
One quarter's rental		2,957 59
Dec. 31, 1910:		
Net cost of subway	4,100,915 79	
One quarter's rental		49,979 91
Alterations: net cost	242,673 93	
One quarter's rental		2,957 59
March 31, 1911:		
Net cost of subway	4,100,915 79	
One quarter's rental		49,979 91
Alterations: net cost	242,673 93	
One quarter's rental		2,957 59
June 30, 1911:		
Net cost of subway	4,100,915 79	
One quarter's rental		49,979 91
Alterations: net cost	242,673 93	
One quarter's rental		2,957 59
		$211,750 00

AMOUNTS PAID FOR RENTAL OF THE WASHINGTON STREET TUNNEL.

The following is a statement of the bills rendered for rental of the Washington street tunnel and the amounts paid thereon:

	Bills Rendered.		*Paid.*
Sept. 30, 1910:			
Net cost of tunnel	$7,533,236 84		$80,000 00
Rental for one quarter		$84,748 92	1,169 03
Dec. 31, 1910:			
Net cost of tunnel	7,540,530 51		80,000 00
Rental for one quarter		84,830 97	4,830 97
March 31, 1911:			
Net cost of tunnel	7,541,380 47		
Rental for one quarter		84,840 53	82,000 00
June 30, 1911:			
Net cost of tunnel	7,556,883 91		
Rental for one quarter		85,014 95	*
Carried forward		$339,435 37	$248,000 00

* Payment for this quarter had not been made at the date of this report ($83,000).

Brought forward	$248,000 00
(During the year there was paid on account of quarter ending June 30, 1910)	85,000 00
	$333,000 00

STATEMENT OF EXPENSES.

The following is a classified statement of the expenses of the Commission for the year ending June 30, 1911:

EAST BOSTON TUNNEL.

General Expenses:		
Office — Stationery and printing . . .	$31 56	
Supplies	2 21	
		$33 77

ENGINEERING DEPARTMENT.

Rooms — Office supplies	$4 75	
Stationery and printing . . .	15 78	
Legal and expert advice	200 00	
Skilled service	208 01	
	$428 54	
Credit:		
Adjustment of stock charges, transferred to Washington street tunnel account . . .	100 00	
		328 54

SECTION B.

Construction	$567 11	
Field supplies	146 16	
Labor	4,786 47	
Office supplies	13 15	
Skilled service	283 59	
Teaming	68 97	
		5,865 45

SECTION F.

Coleman Brothers (Contract No. 192) . .	$1,000 00	
Construction	15 00	
Field supplies	114 43	
Labor	206 21	
Skilled service	18 80	
Teaming	12 16	
		1,366 60
		$7,594 36

SECTION C.

Credit:		
Field supplies, transferred to Section 1, Cambridge Connection, on account of sale of compressor plant	$10,000 00	10,000 00
Net decrease		$2,405 64

BOSTON TUNNEL AND SUBWAY.

General Expenses:		
Office — Printing	$268 30	
Stationery — supplies . . .	12 49	
Carried forward	$280 79	

Brought forward	$280 79	
Transferred from Cambridge Connection general expenses	1,032 85	
		$1,313 64

ENGINEERING DEPARTMENT.

Rooms — Stationery — supplies	$12 78	12 78
		$1,326 42

MISCELLANEOUS.

Labor	$8 00	
Skilled service	321 89	
Stock	492 87	
	$822 76	
Credit:		
Transferred to construction account, Cambridge Connection, for material delivered from stock at yard	1,297 80	475 04
Balance		$851 38

SECTION ONE.

Legal and expert advice	$300 00	300 00

SECTION TWO.

Boylston street station:		
Miscellaneous	$153 75	
Construction	1 44	
Damages	5,000 00	
Labor	57 27	
		5,212 46

SECTION THREE.

Construction	$0 76	
Damages	270 57	
Labor	24 95	
Stationery — supplies	2 00	
		298 28

SECTION FOUR.

Damages	$9,610 27	
Field supplies	3 07	
Insurance	64 00	
Labor	17 95	
Paving	26 45	
Property Damages: Takings	5,100 00	
Stationery — supplies	63	
Telephone-telegraph	33	
Winter street station:		
Miscellaneous	26 13	
	$14,848 83	$6,662 12
Credit:		
Property Damages: Takings, cash received for sale of Salisbury estate	551,232 34	536,383 51
Decrease		$529,721 39
Carried forward (decrease)		$529,721 39

Brought forward (decrease)			$529,721 39

SECTION FIVE.

Construction	$266 95		
Field supplies	41 27		
Labor	622 97		
Legal and expert advice	100 00		
Lighting	2 98		
Old South Meeting House station:			
Miscellaneous	1,103 00		
Property Damages: Takings	4,950 00		
Skilled service	158 76		
Stationery-supplies	1 60		
Teaming	41 65		
Tools	42 92		
		$7,332 10	

SECTION SIX.

Field supplies	$0 93		
Labor	17 25		
Skilled service	1 00		
		19 18	

SECTION NINE.

Construction	$7 54		
Damages	500 00		
Field supplies	20		
Labor	342 69		
Legal and expert advice	125 00		
Property Damages: Takings	31,000 00		
Union street station:			
Miscellaneous	198 92		
		32,174 35	

SECTION ELEVEN.

Paving	$68 00	68 00	
			39,593 63
Net decrease			$490,127 76

CAMBRIDGE CONNECTION.

Office Expenses:			
Furniture		$13 98	
Lighting		69 80	
Printing		1,686 58	
Rental		3,000 00	
Stationery-supplies		461 14	
Telephone-telegraph		107 70	
Stenographers		2,848 05	
Messenger		918 00	
Clerks		952 40	
Salaries of Commissioners and Secretary		28,500 00	
		$38,557 65	
Transferred to Riverbank subway	$18,029 75		
Carried forward	$18,029 75	$38,557 65	

Brought forward	$18,029 75	$38,557 65	
Transferred to Boston Tunnel and Subway	1,032 85		
		19,062 60	
			$19,495 05

ENGINEERING DEPARTMENT.

Advertising	$6 05	
Borings:		
Materials	1 75	
Chief Engineer	2,708 33	
Field supplies	8 50	
Furniture	4 00	
Instruments	122 67	
Insurance	40 00	
Labor	1,410 60	
Legal and expert advice	620 00	
Lighting	325 70	
Messengers	1,440 44	
Printing	1,073 35	
Rental	3,000 00	
Skilled service	24,322 45	
Stationery-supplies	1,097 02	
Stenographers	3,087 70	
Teaming	31 50	
Telephone-telegraph	241 74	
Testing	2 12	
Tools	9 75	
	$39,553 67	
Credit — Stock	66 02	
		39,487 65

SECTION ONE.

(*From a point about 130 feet northwesterly from the corner of Grove and Phillips streets to a point on Boston Common about 220 feet southeasterly from Beacon street.*)

Patrick McGovern (Contract No. 382)	$272,902 79	
L. F. Shoemaker & Co. (Contract No. 385)	92 13	
Alterations	235 53	
Construction	27,109 76	
Field supplies	232 92	
Fuel	62 96	
Furniture	8 15	
Inspection	9 70	
Instruments	26 53	
Labor	1,740 39	
Legal and expert advice	285 00	
Lighting	145 41	
Paving	8 00	
Printing	5 25	
Property Damages: Takings	4,050 00	
Rental	660 00	
Skilled service	4,182 23	
Stationery-supplies	229 47	
Teaming	1,038 10	
Telephone-telegraph	54 99	
Testing	27 82	
Tools	6 35	
		313,113 48
Carried forward		$372,096 18

Brought forward		$372,096 18

SECTION TWO.

(*From the end of Section One under Boston Common and the Park street station of the Tremont street subway to Tremont street opposite Winter street.*)

Bethlehem Steel Company (Contract No. 389)	$12,281 43	
Bethlehem Steel Company (Contract No. 390)	937 36	
Bethlehem Steel Company (Contract No. 396)	3,985 72	
Carnegie Steel Company (Contract No. 392)	10,044 41	
Coleman Brothers (Contract No. 393)	236,846 49	
Advertising	92 61	
Alterations	393 08	
Borings	225 23	
Construction	43,424 03	
Fuel	185 73	
Furniture	10 50	
Inspection	190 59	
Instruments	73 49	
Labor	8,547 97	
Lighting	444 89	
Printing	206 40	
Skilled service	10,219 81	
Stationery-supplies	245 17	
Supplies (field)	539 00	
Teaming	6,268 40	
Telephone-telegraph	65 67	
Testing	72 97	
Tools	369 79	
Water pipes	700 01	
		336,370 75

RIVERBANK SUBWAY.

Office Expenses:		
Proportion of general expenses, transferred from Cambridge Connection	$18,029 75	
Printing	94 70	
Stationery-supplies	19 92	
		18,144 37
Engineering Expenses:		
Proportion of salary of Chief Engineer, transferred from Cambridge Connection	$2,708 34	
Advertising	23 70	
Counting traffic	227 19	
Furniture	150 00	
Instruments	6 30	
Labor	85 75	
Legal and expert advice	339 04	
Messengers	128 48	
Printing	38 81	
Skilled service	1,901 56	
Stationery-supplies	50 00	
Stenographers	611 40	
Field supplies	30 52	
		6,301 09

SECTION ONE.

Field supplies	$2 35	2 35
Carried forward		$732,914 74

Brought forward		$732,914 74

SUBWAY — PARK STREET TO SOUTH STATION.

(CHAPTER 94 — RESOLVES OF THE YEAR 1910.)

Clerks	$4 68	
Skilled service	434 63	
Stenographers	38	
Supplies	92 78	
		532 47

SUBWAYS — DORCHESTER AND SOUTH BOSTON.

(CHAPTER 97 — RESOLVES OF THE YEAR 1910.)

Clerks	$4 68	
Labor	64 45	
Messengers	5 58	
Skilled service	1,264 46	
Stenographers	50 27	
Supplies	275 99	
		1,665 43

INTEREST.

Cambridge Connection	$20,173 64	
Riverbank Subway	9,068 50	
	$29,242 14	
Credit:		
Boston Tunnel & Subway	5,329 92	
		23,912 22
Total		$759,024 86
Less net decrease on East Boston Tunnel	$2,405 64	
Less net decrease on Boston Tunnel and Subway	490,127 76	
		492,533 40
Net increase		$266,491 46

SUMMARY.

	From beginning of work to June 30, 1910.	June 30, 1910, to June 30, 1911.	Total.
Subway — Subway Commission	$14,131 16		$14,131 16
Part of General Expenses	117,510 78		117,510 78
Engineering and Miscellaneous	407,475 48		407,475 48
Section One	239,407 12		239,407 12
Two	363,605 50		363,605 50
Three	300,639 36		300,639 36
Three and one-half	9,355 70		9,355 70
Four	469,620 33		469,620 33
Five	388,955 49		388,955 49
Six	327,541 86		327,541 86
Seven	231,504 27		231,504 27
Eight	95,902 06		95,902 06
Eight and one-half	76,639 47		76,639 47
Carried forward	$3,042,288 58		$3,042,288 58

	From beginning of work to June 30, 1910.	June 30, 1910, to June 30, 1911.	Total.
Brought forward	$3,042,288 58		$3,042,288 58
Section Nine	299,452 07		299,452 07
Ten	254,497 88		254,497 88
Eleven	270,310 57		270,310 57
Interest	258,575 60		258,575 60
	$4,125,124 70		$4,125,124 70
Transfer to Alterations, see 11th report	4 95		4 95
Total	$4,125,119 75		$4,125,119 75
Alterations — Part of General Expenses	$28,945 53		$28,945 53
Section Three	2,568 26		2,568 26
Four	163 42		163 42
Five	30,233 01		30,233 01
Seven	178,516 16		178,516 16
Nine	3 00		3 00
Ten	534 04		534 04
Interest	1,905 56		1,905 56
Transfer from Subway, see 11th report,	4 95		4 95
Total	$242,873 93		$242,873 93
Charlestown Bridge: Total	$1,570,197 98		$1,570,197 98
East Boston Tunnel — Part of General Expenses	$161,061 08	$33 77	$161,094 85
Engineering Expenses	190,947 68	328 54	191,276 22
Section A	98,869 09		98,869 09
B	1,374,990 59	5,865 45	1,380,856 04
C	494,352 21	*10,000 00	484,352 21
D	244,822 98		244,822 98
E	188,201 14		188,201 14
F	242,366 93	1,366 60	243,733 53
Interest	248,156 88		248,156 88
Total	$3,243,768 58	*$2,405 64	$3,241,362 94
Boston Tunnel and Subway — Part of General Expenses	$225,087 99	$1,313 64	$226,401 63
Engineering Expenses	418,193 55	*462 26	417,731 29
Section One	736,674 04	300 00	736,974 04
Two	637,697 55	5,212 46	642,910 01
Three	460,859 92	298 28	461,158 20
Four	2,304,630 83	*536,383 51	1,768,247 32
Five	1,034,271 73	7,332 10	1,041,603 83
Carried forward	$5,817,415 61	*$522,389 29	$5,295,026 32

* Decrease.

	From beginning of work to June 30, 1910.	June 30, 1910, to June 30, 1911.	Total.
Brought forward .	$5,817,415 61	*$522,389 29	$5,295,026 32
Section Six . .	335,038 08	19 18	335,057 26
Seven . .	139,466 40		139,466 40
Eight . .	616,253 51		616,253 51
Nine . .	627,746 37	32,174 35	659,920 72
Ten . .	142,880 35		142,880 35
Eleven . .	345,425 91	68 00	345,493 91
Twelve . .	45,417 52		45,417 52
Interest . . .	650,515 97	*5,329 92	645,186 05
Total . . .	$8,720,159 72	*$495,457 68	$8,224,702 04

* Decrease.

Investigation of Congestion of Traffic, etc.,			
Office Expenses . .	$94 46		$94 46
Engineering Expenses	2,921 46		2,921 46
Total . . .	$3,015 92		$3,015 92
Cambridge Connection — Office Expenses .	$24,561 30	$19,495 05	$44,056 35
Engineering Expenses	34,620 30	39,487 65	74,107 95
Section One . .	153,833 16	313,113 48	466,946 64
Section Two . .	70 31	336,370 75	336,441 06
Interest . . .	12,075 00	20,173 64	32,248 64
Total . . .	$225,160 07	$728,640 57	$953,800 64
Riverbank Subway —			
Office Expenses . .	$4,286 75	$18,144 37	$22,431 12
Engineering Expenses	7,570 73	6,301 09	13,871 82
Section One . .		2 35	2 35
Interest . . .	461 51	9,068 50	9,530 01
Total . . .	$12,318 99	$33,516 31	$45,835 30
Subway — Park street to South Station:			
Total . . .		$532 47	$532 47
Subways — Dorchester and South Boston:			
Total . . .		$1,665 43	$1,665 43
Grand total . .	$18,142,614 94	$266,491 46	$18,409,106 40

The report of the Chief Engineer is appended.

GEORGE G. CROCKER,
GEORGE F. SWAIN,
HORACE G. ALLEN,
JOSIAH QUINCY,
JAMES B. NOYES,
Boston Transit Commission.

REPORT OF THE CHIEF ENGINEER.

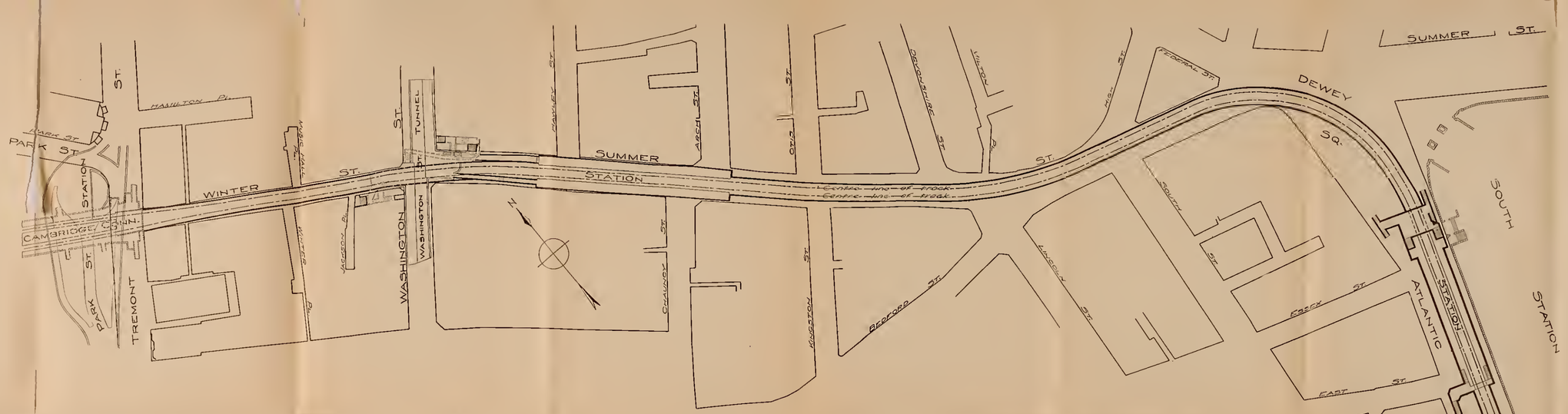
BOSTON, June 30, 1911.

GEORGE G. CROCKER, GEORGE F. SWAIN, HORACE G. ALLEN, JOSIAH QUINCY, JAMES B. NOYES, *Boston Transit Commissioners.*

GENTLEMEN,—I herewith submit a report for the year ending on this date, referring principally to the construction of the tunnel under Beacon Hill and the station for the Cambridge connection near Park street under the Boston Common.

TUNNEL UNDER BEACON HILL FOR CAMBRIDGE CONNECTION.

Adopting a method used in some former reports, the more important statistical data as to the year's work are given in Tables 1 to 3, inclusive. They are followed by brief descriptions.



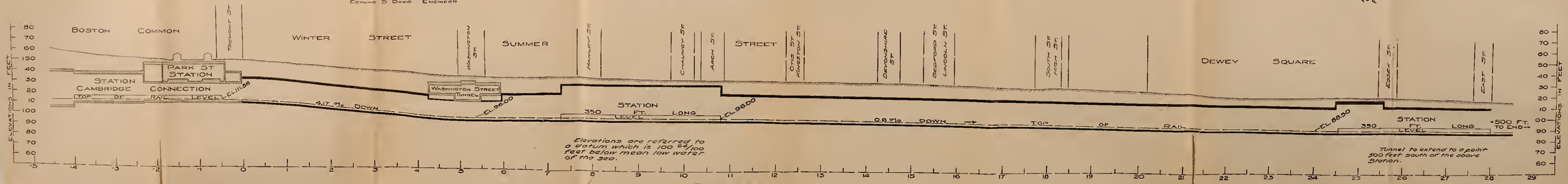
STUDY FOR SUBWAY
FROM
PARK ST. SUBWAY STATION
TO
SOUTH STATION
CHAPTER 94 RESOLVES 1910
DECEMBER 1910

EDMUND S DAVIS ENGINEER

PLAN

100 2 3 4
SCALE OF FEET

PREPARED BY ORDER OF
JOINT BOARD
CONSISTING OF THE MEMBERS OF
THE MASSACHUSETTS RAILROAD COMMISSION
AND THE BOSTON TRANSIT COMMISSION



PROFILE

THOMPSON

No. 1.—CONSTRUCTION.

Section, etc.	Location and Description of Structures.	Plates in This and Previous Annual Reports.	Assistant Engineer.	Contractor and Date of Contract.	Amount of Contract.	Appendices Showing Bids in This and Previous Annual Reports.	Date of Completion Named in Contract.
Section 1, tunnel under Beacon Hill.	The line begins about 130 feet northwest of the intersection of Phillips and Grove streets and in the rear portion of lots numbered 13 and 15 Grove street, and extends in a southeasterly direction under private lands. It crosses diagonally under Phillips, Grove, Anderson, Revere, Myrtle, Pinckney, Mt. Vernon, Joy and Beacon streets, to a point about 100 feet within Boston Common. The length of the section is about 1,873 linear feet. The tunnel, excepting the flat-roofed section of about 280 linear feet at its westerly end, has an exterior width of about 32 feet and a height of about 30 feet. The structure is made of concrete reinforced with steel rods where required. Under a portion of the street and buildings near Phillips and Grove streets steel I-beams were used in the roof. Steel posts were used in a portion of the centre wall of the short piece of double-barrelled construction near the westerly end of the tunnel. There are refuge niches about 15 feet apart in each wall.	XVI., 1, 2, 3, 5, 6, 7, 8, 9, 10. XVII., 1, 2, 3.	G. Dana Emerson.	Patrick McGovern, September 17, 1909.	$469,097 50	XV., J, AA, CC, DD, EE, and GG. XVI., O.	July 1, 1911. (Certificate of completion, April 11, 1911.)
Section 2, station near Park and Tremont streets.	The westerly end of the section is under Boston Common about 280 feet easterly from the junction of Beacon and Joy streets and the section runs easterly under Boston Common and under the old Tremont Street Subway at Park street to the intersection of Tremont and Winter streets. Its length is about 614 feet. The section includes a three-platform station, located under a portion of the existing Park street subway station and Boston Common with entrances and exits at Tremont street and also through the present subway station. The structure is mainly of concrete reinforced with steel rods. In a portion of the station steel posts and I-beams with concrete are used. The first 212 feet is a single arch bell-mouth; the next 172 feet, comprising about one-half of the station, is a double arch, and the remainder has a flat roof.	XVI., 1, 2, 3, 4. XVII., 1, 4, 5, 6, 7, 8, 9, 10.	Wilbur W. Davis.	Coleman Brothers, August 31, 1910.	281,450 00	XVII., O, P, R.	September 1, 1911.

No. 2.— PROGRESS OF CONSTRUCTION.

Section, Location or Description of Work.	Dates of Beginning.		Dates of Completion.		Amount of Work Done, Year Ending June 30, 1911.		Total Amount of Work Done to and Including June 30, 1911, from Beginning of Work.		Number of Men Ordinarily Employed by the Contractor, Year Ending June 30, 1911.	
	Excavation.	Concrete.	Excavation.	Concrete.	Excavation in Cubic Yards.	Concrete in Cubic Yards.	Excavation in Cubic Yards.	Concrete in Cubic Yards.	Day.	Night.
Section 1, tunnel under Beacon Hill.	Sept. 29, 1909.	Oct. 11, 1909.	Feb. 28, 1911.	April 6, 1911.	32,928	10,238	52,371	16,592	150	150 up to Sept. 24, 1910. (Shield work discontinued.) 45, Sept. 25 to Oct. 23, 1911. (Drift work discontinued.)
Section 2, bell-mouth tunnel and station near Park and Tremont streets.	Sept. 8, 1910.	Sept. 30, 1910.	In progress.	In progress.	38,000	10,000	38,000	10,000	135	135

No. 3.— EXCAVATION DATA.

(From beginning of the work.)

Location or Description of Work.	Character of Earth Found in Excavation.	Disposition of Surplus.
Section 1, tunnel under Beacon Hill.	Hard, sandy, blue and yellow clay, mixed with numerous small stones and a few boulders, and occasional pockets and veins of sand. The earth became harder as the easterly side of the hill was reached, and light charges of dynamite were used to facilitate excavation after the shield was beyond private buildings and under Beacon street and the Common.	1,718 cubic yards to Charles River Dam. 40,809 cubic yards to Scully's dump, East Cambridge. 2,152 cubic yards to Stuart street, Boston. 418 cubic yards to Sixth street, Cambridge. 1,598 cubic yards to Charles River Parkway, Cambridge. 4,866 cubic yards to Amherst street, Cambridge. 810 cubic yards to miscellaneous places. 52,371 cubic yards.
Section 2, bell-mouth tunnel and station near Park and Tremont streets.	The material encountered on this section has been very hard sandy clay with small stones. There have been a few pockets and narrow seams of sand, some of them water bearing, but in such small quantities as to offer no serious difficulties. No rock has been found. A few small boulders have been encountered, the largest of which measured only a cubic yard.	Nearly all of the surplus excavation thus far has been used to fill low land in the Back Bay Fens, between Boylston road and Agassiz road. The conveying has been done by teams and by the Boston Elevated Railway Company's trains between 12.30 a. m. and 5.30 a. m.

HELIOTYPE CO. BOSTON

SECTION 1, BEACON HILL TUNNEL. NEAR STATION 5 + 45. LOOKING SOUTHEASTERLY.

PLATE 2

HELIOTYPE CO. BOSTON

SECTION 1, BEACON HILL TUNNEL. NEAR STATION 12 + 00. LOOKING SOUTHEASTERLY.

PLATE 3

SECTION 1, TUNNEL UNDER BEACON HILL.

About 300 feet of the westerly end of the section was built in open cut. All the remaining portion was constructed by means of a roof-shield.

The contract for Section 1 originally extended to station 21+00, *i. e.*, to a point about 200 feet within the Common. Upon making the detailed design for Section 2, it was found that about 120 feet of the easterly end of Section 1 should be widened into a bell-mouth to provide for cross-overs between tracks west of the station, and as this could not be built with the shield, the portion for bell-mouth was taken from Section 1 and included in Section 2.

The average progress from the time the shield was started until September 24, 1910, when night work was discontinued, was 7.33 feet per day. After that date, the work being carried on by day only, the average daily progress was 4.4 feet.

Upon completion of the shield work the portion of the shield inside the clearance line was cut out and the remainder was then concreted into the tunnel arch. Plate 2 is a view inside the tunnel looking southeasterly from near Station 5+45 and Plate 3 is another view looking southeasterly from near Station 12+00.

The construction of Sections 1 and 2 were begun independently of each other, the location and direction of each being determined by a figured traverse. When the headings of Section 1 reached Section 2 it was found that the difference between alignment was 0.035 of a foot and the difference in grade 0.02 of a foot.

SECTION 2, INCLUDING TUNNEL BELL-MOUTH AND THE PASSENGER STATION NEAR PARK AND TREMONT STREETS.

The following paragraph is abridged from a statement which appeared in the preceding annual report and is repeated to aid in making the present report self-contained.

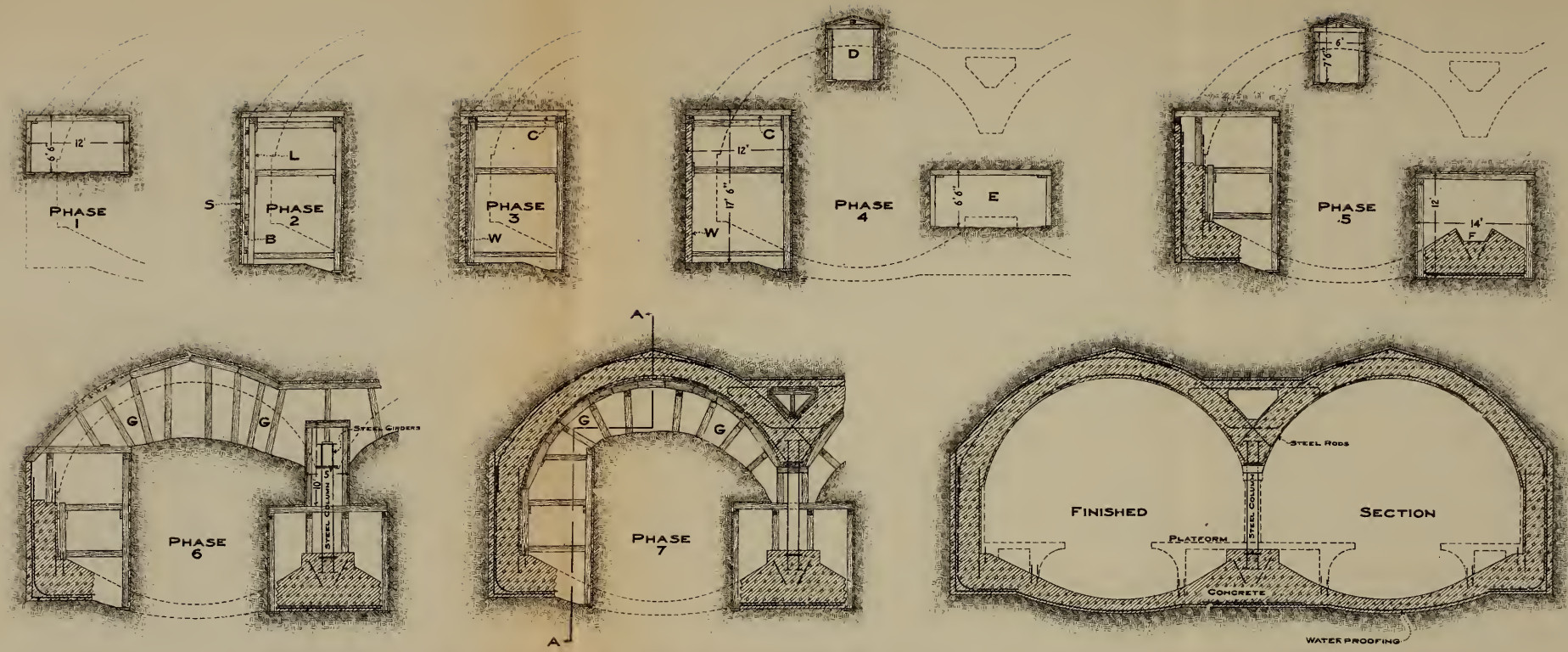
The three platforms — see Plate 4 — extend from Tremont street, westerly, about 350 feet. Their easterly ends will be under the present Park Street Station. The central platform will be used only for passengers taking the cars. The two side platforms will be used only for passengers leaving the cars. There will be six stairways connecting the present Park Street Subway Station with the new Tunnel station below. Two of

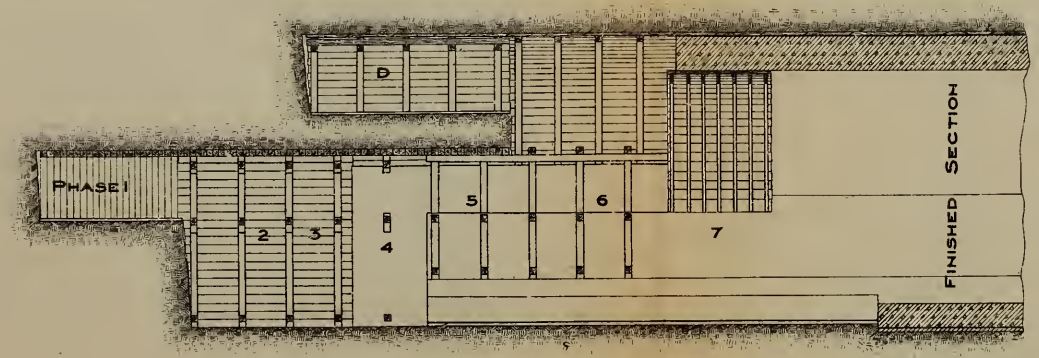
these stairways, one from each of the present platforms of the Park Street Subway Station, will lead down to the central platform of the Tunnel station. There will be stairways leading up from each of the side platforms to each of the present subway platforms. There will be stairs from Tremont street leading down to a ticket office lobby, and from the lobby down to the platforms of the Tunnel station. There will also be inclined elevators for exit leading from the two side platforms up to the sidewalk on the easterly side of Tremont street, one coming to the surface opposite Park street and the other in front of the building now occupied for the United States Custom House.

Owing to the depth below the surface of the Common, and to prevent injury to trees, it was decided to build the westerly half of the section by tunneling. Shaft number one, 18 feet by 41 feet, was sunk near the westerly end of the section, near Beacon street, from which headings were worked. The method of tunneling will be hereinafter described. The shaft was 65 feet deep, that being the depth of the invert of the tunnel below the surface of the ground, and also the deepest part of the section. The site of the shaft was selected on account of its being near the Beacon Street Mall, the only part of the Common over which teaming for the work was allowed by the contract. It was also thought well, for the sake of the store occupants, to defer work on Tremont street until spring so as to minimize the interference during cold weather with the areas under the sidewalks which connect with the store basements. An agreement therefore was made with the contractor not to begin work on Tremont street before April 1, 1910. In consideration of which he was allowed to sink shaft number two, 18 feet by 12 feet, near the middle of the section, on the Common, which enabled him to work double the number of headings for tunneling; the station and approach tunnels being driven between shafts by means of a series of drifts.

The material excavated from shaft number two has been hoisted in buckets to the surface and conveyed by an overhead belt on a trestle to hoppers near shaft number one.

For a distance of about 56 feet westerly from the Tremont Street Subway, Park Street Station, the open cut method of excavation was necessary for the reason that the roof of the chamber for a connection with the proposed Riverbank Subway comes within a few feet of the surface of the ground.





LONGITUDINAL SECTION
ON LINE A-A

BOSTON TRANSIT COMMISSION

BEACON HILL TUNNEL SECTION 2

DOUBLE ARCH SECTION OF STATION

CROSS SECTIONS SHOWING DIFFERENT PHASES OF CONSTRUCTION

4 0 10 20 30
SCALE OF FEET

EDMUND S. DAVIS CHIEF ENGINEER

HELIOTYPE CO. BOSTON

SECTION 2. BEACON HILL TUNNEL. NORTHERLY DRIFT, UPPER LEVEL, NEAR STATION 22 + 25. LOOKING EASTERLY.
6 IN. X 8 IN. TIMBERS PLACED VERTICALLY ALONG THE SIDES AND 6 IN. X 8 IN. TIMBERS OVERHEAD.
TIMBER ULTIMATELY ALL REMOVED. OCTOBER 31, 1910.

PLATE 6

SECTION 2. BEACON HILL TUNNEL. NORTHERLY DRIFT, LOWER LEVEL, NEAR STATION 21 + 50. LOOKING WESTERLY. THE BLOCKING BACK OF THE VERTICAL LEGS ON THE RIGHT WAS REMOVED AND THE HORIZONTAL LAGGING MOVED FORWARD AGAINST THE LEGS, THUS SERVING AS FORMS FOR PLACING BACK-WALL 8 IN. THICK. TIMBER ULTIMATELY ALL REMOVED. OCTOBER 26, 1910.

HELIOTYPE CO. BOSTON

SECTION 2, BEACON HILL TUNNEL. SOUTHERLY DRIFT, NEAR STATION 20 + 50. LOOKING EASTERLY.
TIMBER ULTIMATELY ALL REMOVED. NOVEMBER 1, 1910.

PLATE 8

HELIOTYPE CO. BOSTON

SECTION 2, BEACON HILL TUNNEL. SOUTHERLY DRIFT, LOWER LEVEL, NEAR STATION 20+50. LOOKING EASTERLY.
TIMBER ULTIMATELY ALL REMOVED. OCTOBER 26, 1910.

SECTION 2, BEACON HILL TUNNEL. ARCH AT STATION 21 + 39.50. LOOKING WESTERLY. TAKEN IN THE CROSS-CUT FOR ARCH BETWEEN SIDE DRIFTS AND SHOWING CENTER DRIFT IN CROWN OF THE ARCH, WOODEN FORMS FOR PLACING THE CONCRETE ARCH AND SOME OF THE ARCH IN PLACE. JANUARY 10, 1911.

All of the earth from this open cut, and most of that from under the old Tremont Street Subway, or about one-sixth of the entire excavation of this section, has been carried away at night through the old subway, in trains of the Boston Elevated Railway Company.

The following, with reference to Plate 5, describes the method of removing the earth and the successive stages in placing the concrete forming the double arch portion of the tunnel:

At the westerly face of the open cut before mentioned, drifts or headings were started at either side line of the tunnel and were run parallel to the center line — see Phase 1. After an upper heading—see Plate 6—had been advanced 15 or 20 feet a lower heading was commenced and carried after the said upper one — see Phase 2. Plates 7, 8 and 9 although taken in the drifts for the single arch portion of the tunnel illustrate the method. The leg "L" was placed carefully to line, at a given distance from the digging line, and the sheeting "S" against the earth was then set in place by firmly wedging in the blocks "B." When the concrete back wall "W" was ready to be placed the blocks were knocked away, loosening the sheeting which was then moved into the position shown in Phase 3 to make the forms for the back wall in the proper place without rebracing. After the concrete back wall had become sufficiently strong the caps "C" were supported on its top, the legs were removed, and the drift was braced directly against the face of the back wall — see Phase 4.

At the same time that side-wall drifts were being advanced, drifts "D," one at the crown of either arch of the double barrel section, were being advanced from the open cut; also the drift "E" was being excavated on the center line of the tunnel, followed by a lower drift, "F," shown on Phase 5.

While these drifts were being advanced westerly from the open cut, corresponding drifts running easterly were being advanced to meet them from shaft number two.

Phase 5 also shows the concrete side walls and the concrete footings in place for the center columns.

A narrow drift in which to place the steel center columns and girders was made over the center drift shown in Phase 6.

From the crown drifts cross-cuts "G," about 5 feet wide, were dug in both directions, at right angles to the center line of the tunnel, until they met the tops of the side and center

drift respectively. The tops of these drifts conformed to t outside of the arch roof of the completed tunnel—see Phase 6.

Phase 7 shows the forms for the concrete arch and arch place.

Lastly the earth core was removed and the invert was buil making the finished section.

The single arch, or bell-mouth, portion of the tunnel wa constructed in substantially the same manner, there bein only the side drifts and the center crown drift with com cross-cuts. Plates 7, 8, 9 and 10 are views in part of the tunnel.

To prevent settlement and possible breakage during work of tunneling below it was necessary to su water pipe for a length of 80 feet across the l at about Station 22+00. The pipe was unco pended from four 18-inch I-beams each 60 The I-beams bridged two pairs of wooden uprights each feet long, each pair standing in a shaft and the shafts being apart. Seventy-two feet of the said pipe was raised the center and nothing at the ends, to allow for the of the roof of the ventilation chamber directly belo The raising was done while the pipe was carrying water.

Under the Park Street Station of the old subway the tion required the removal of the entire invert and platform and the temporary support of the roof and columns of the old structure above the new. All of this work has been done except a small portion of the easterly side of the old subway. It has been accomplished so far without discommoding the passengers and without delaying the many cars which pass through the subway.

Some of the concrete cut from the old structure is to be used as ballast under the tracks in the deep invert of the new tunnel.

Under Tremont street the excavation was 45 feet below the surface, and very close to the foundations of some of the buildings. At the northeast and the southeast corner of Tremont and Winter streets the foundations were carried down to an additional depth of 31 feet. There was no settlement of buildings.

Provision is made for ventilation of the tunnel by means of fans in a chamber built above and between the two arches of the double barrel section at the extreme westerly end of the station. The air will be discharged through an opening directly above, on the surface of the Common.

The entire outside of this section so far as completed is

waterproofed, to prevent draining the Common and to keep the interior of the structure dry. Four layers of tar paper, each layer mopped with hot pitch, were used on the bottom of the invert and on the back of the walls. Owing to the difficulty of applying this to the roof of the tunnel section a specially prepared cloth and asphalt were used.

The section is practically completed westerly from the westerly side of Tremont street except the platforms, stairways and interior finish of the station.

There has been one fatal accident, to a workman who fell about 40 feet in a shaft. There has been no accident to persons or property due to faulty or careless methods of construction.

EAST BOSTON TUNNEL.

Additional Support of Air Duct.—Extending the precautionary measures of former years, a section of the air duct, 250 feet in length, just east of the Atlantic Avenue Station, has been given additional support by the use of copper wires, drawn tightly beneath the duct, at intervals of 20 inches and anchored to the arch by copper bolts. A 20-foot section beneath the fan chambers at Lewis street has also been treated in this manner.

Water-tightness.—The data as to the East Boston Tunnel in the table below of the relative water-tightness of American subaqueous tunnels for electric cars were obtained by measurements made in 1909; that as to others is from information given recently to the Institution of Civil Engineers, London, by Mr. W. J. Wilgus, lately vice-president in charge of engineering of the New York Central Railroad lines.

Order of Water-tightness.	Location.	River or Harbor.	Leakage in Gallons, per Twenty-four Hours. Per Cubic Foot Interior Volume.
1	New York	North River Pennsylvania Railway	0.0005
2	Detroit	Detroit River	0.0027
3	Boston	Harbor (East Boston Tunnel)	0.0030
4	New York	East River Pennsylvania Railroad	0.0035 to 0.0070
5	Sarnia	St. Clair River	0.0080
6	New York	East River Battery	0.0102
7	New York	North River Hudson-Manhattan	0.0125

All of the tunnels in the foregoing table except the East Boston have shells of cast iron or of steel plate calked to lessen leakage. In the case of the Detroit Tunnel a calked steel plate skin is employed with inner and outer walls of concrete respectively twenty and thirty-six inches or more in thickness. The construction cost of such tunnels has been greater than that of the East Boston Tunnel.

Grouting of shrinkage cracks and of relatively porous places where small leaks occur in the arch and upper side walls has been continued throughout the length of the tunnel, from Atlantic avenue to near Webster street in East Boston, and many of them have been stopped. A special German iron-ore cement, which so far as known is not affected by salt water, has been used for this purpose and 16 cubic yards of the grout have been forced into porous places.

While hunting for seepage along the side walls, various sections of terra-cotta lining which were either loose or interfered with the work of drilling have been removed.

ENGINEERING FORCE.

I am indebted to Consulting Engineer Howard A. Carson for valuable suggestions and to the assistant engineers and others in the department for their efficient service. The names of those who have been employed for more than one month are given in Appendix N.

Respectfully submitted,

EDMUND S. DAVIS,
Chief Engineer.

APPENDIX A.

AGREEMENT FOR SALE OF SALISBURY ESTATE.

AGREEMENT made this twenty-ninth day of July, 1910, by and between the City of Boston, acting by the Boston Transit Commission, its members not being bound in their personal capacity, of the first part, and Moses Williams, Samuel Carr and Amory Eliot as trustees of the Business Real Estate Trust under an agreement and declaration of trust recorded with Suffolk Deeds, book 2794, page 273, of the second part.

The said city hereby agrees to sell and the said trustees to purchase a certain parcel of land with the buildings thereon situate on the north corner of Washington and Summer streets in said Boston, as taken by the said Boston Transit Commission, September 12, 1907, and described in a certain instrument dated September 12, 1907, and recorded with Suffolk Deeds, book 3234, page 562, excepting however and reserving to said city such portions of the said premises as are now being used by the Boston Elevated Railway Company as lessee of the said city for railway purposes and such easements therein as such use entails; and also reserving to said city the right to use hereafter such portions of the premises below the level of the present basement floor, being the first floor below the ground floor, as the said city may at any time need for subway or tunnel purposes and purposes incidental thereto, or growing out thereof, provided however that the said trustees, their successors and assigns, shall have suitable privileges and rights for foundations or support of the present or any future building or buildings on the tunnel or subway structures or otherwise.

The said premises are to be conveyed by a good and sufficient deed conveying a good and clear title thereto free from all encumbrances excepting the reservations above mentioned and any taxes that may be assessed thereon for the year 1911 to 1912, and excepting also the present lease to George N. Talbot, dated June 1, 1910, expiring on December 31st, 1913, but the city acting by the Boston Transit Commission and said Commission hereby agree on the first day of June, 1911, or as soon thereafter as may be, but prior to the execution and delivery of said deed, to cause notice to be served on the lessee under said lease terminating the same on or before the first day of January, 1912, the said trustees on their part agreeing to pay or cause to be paid to the city rent at the rate of nineteen thousand dollars per annum for such time as may elapse between the service of notice terminating such lease and delivery of the deed conveying title as aforesaid.

It is understood and agreed that if, owing to ownership by the city, taxes for the year 1911 to 1912 are not laid on the premises, then at the time when taxes become payable for such year a sum equal to the amount of the taxes which would have been payable on said premises had the ownership thereof been in an individual is to be paid to the city in part by said Talbot in accordance with his agreement under said lease, and the balance by said trustees.

Full possession of the said premises subject to said lease shall be delivered at the time of the delivery of the deed, said premises to be then in the same condition in which they are now, reasonable use and wear of the buildings thereon and damage by fire or other unavoidable casualty excepted.

The said buildings shall until the full performance of this agreement be kept insured in the sum of twenty thousand dollars by the city and in case of any loss all sums recovered or recoverable on account of said

insurance shall be paid over or assigned on delivery of the deed to the said trustees unless the premises shall previously have been restored to their former condition by the city.

Rents and premiums on insurance policies shall be apportioned as of the day of the delivery of said deed.

The city, subject to the approval of the Boston Elevated Railway Company, further agrees to convey to said trustees, their successors or assigns certain rights of passage to and from the adjoining premises and certain show window privileges outlined in a letter dated November 11, 1909, addressed by the Commission to the trustees substantially as assented to by said company in its letter to the Commission dated November 22, 1909, and subject to the limitations therein set forth, to take effect when said trustees or their successors or assigns proceed to erect a building on the premises above described and upon the adjoining premises. It is understood and agreed that this instrument is null and void unless said company approves of such conveyance of rights and privileges by a writing to be attached hereto prior to the payment of said sum of two hundred and ninety thousand dollars.

For such deed with conveyance of rights and privileges as above the said trustees agree to pay the sum of five hundred and sixty thousand dollars in cash of which the sum of two hundred and ninety thousand dollars is paid upon the delivery of this agreement and the balance of two hundred and seventy thousand dollars, less an allowance of nine thousand dollars on account of such prepayment, is to be paid upon the delivery of such deed and conveyance.

The deed with conveyance of rights as above is to be delivered and said two hundred and seventy thousand dollars less nine thousand dollars, or two hundred and sixty-one thousand dollars is to be paid at the Suffolk Registry of Deeds at twelve o'clock noon on the thirtieth day of June, 1911, unless the parties hereto agree on some place, hour and day between the first day of June, 1911, and the thirtieth day of said June.

IN WITNESS WHEREOF the said parties have executed this instrument in triplicate on the day and year first above written.

(Signed)

[CITY SEAL.]

GEORGE G. CROCKER,
GEORGE F. SWAIN,
HORACE G. ALLEN,
JOSIAH QUINCY,
JAMES B. NOYES,
City of Boston acting by the Boston Transit Commission.

MOSES WILLIAMS, (LS.)
SAMUEL CARR, (LS.)
AMORY ELIOT, (LS.)
as Trustees of the Business Real Estate Trust, but not individually.

Approved as to form.

(Sgd.) THOMAS M. BABSON,
Corporation Counsel.

BOSTON, MASS., July 28, 1910.

The Boston Elevated Railway Company for valuable consideration it hereto moving hereby approves of the agreement to convey and the conveyance of certain rights and privileges by the City of Boston, acting by the Boston Transit Commission, to Moses Williams, Samuel Carr and Amory Eliot, trustees, as set forth in an agreement dated July 29, 1910, for the sale and purchase of the property at the corner of Washington and Summer streets, a copy of which is hereto annexed.

(Signed) BOSTON ELEVATED RAILWAY COMPANY,
by WILLIAM A. BANCROFT,
President.

APPENDIX B.

[CHAPTER 43.]

RESOLVE TO PROVIDE FOR AN INVESTIGATION AND A REPORT RELATIVE TO THE PROPOSED EAST AND WEST TUNNEL AND SUBWAY IN THE CITY OF BOSTON.

Resolved, That the board of railroad commissioners and the Boston transit commission, sitting together as a joint board, be instructed to consider and report within one month from the passage of this resolve whether, between the termini for the east and west tunnel and subway, as defined in section one of chapter five hundred and seventy-three of the acts of the year nineteen hundred and seven, a route in part under or near Boylston street would be preferable to the route defined in said act and, if so, to give a general description of said route with an approximate estimate of the cost of construction of a tunnel and subway thereon; and also to report whether such construction at the present time would in its opinion interfere with the future proper development of the transportation system within the metropolitan district; and whether a change of route at the present time would result in such delay in the completion of said tunnel and subway as would be inconsistent with the public welfare. The expenses incurred in making the foregoing investigation, including surveys and plans, shall be deemed a part of the cost of the tunnel and subway, the construction of which was provided for by said chapter five hundred and seventy-three of the acts of the year nineteen hundred and seven. [*Approved April 6, 1911.*

APPENDIX C.

THE COMMONWEALTH OF MASSACHUSETTS.

To the Senate and House of Representatives:

Chapter 43 of the Resolves of the year 1911, approved April 6th, reads as follows:

RESOLVE TO PROVIDE FOR AN INVESTIGATION AND A REPORT RELATIVE TO THE PROPOSED EAST AND WEST TUNNEL AND SUBWAY IN THE CITY OF BOSTON.

Resolved, That the board of railroad commissioners and the Boston transit commission, sitting together as a joint board, be instructed to consider and report within one month from the passage of this resolve whether, between the termini for the east and west tunnel and subway, as defined in section one of chapter five hundred and seventy-three of the acts of the year nineteen hundred and seven, a route in part under or near Boylston street would be preferable to the route defined in said act and, if so, to give a general description of said route with an approximate estimate of the cost of construction of a tunnel and subway thereon; and also to report whether such construction at the present time would in its opinion interfere with the future proper development of the transportation system within the metropolitan district; and whether a change of route at the present time would result in such delay in the completion of said tunnel and subway as would be inconsistent with the public welfare. The expenses incurred in making the foregoing investigation, including surveys and plans, shall be deemed a part of the cost of the tunnel and subway, the construction of which was provided for by said chapter five hundred and seventy-three of the acts of the year nineteen hundred and seven.

In accordance with the terms of this resolve the Board of Railroad Commissioners and the Boston Transit Commission, sitting together as a joint board, having duly organized and carefully considered the subject matter of the reference, now make report thereon within the time limit prescribed.

The Joint Board in the first place answers as follows the categorical questions to which it is instructed to reply:

First, we find that a route "in part under or near Boylston street would be preferable to the route defined" in chapter five hundred and seventy-three of the acts of the year nineteen hundred and seven, namely, the Riverbank subway route, as a line for an east and west subway in the city of Boston between the termini fixed by or under said act.

Second, a "general description" of such preferable route would be from an open cut in the reserved space in the center of Commonwealth avenue at its junction with Beacon street by subway under Commonwealth avenue, the Fenway, Newbury street, crossing under Massachusetts avenue, thence passing under private land and land of the city of Boston to a point under Boylston street, near Hereford street, thence under Boylston street to the corner of Tremont street, and thence under the Tremont street subway tracks, or adjacent to such tracks on the same level, to a terminus at or near the present Park street station.

An approximate estimate of the cost of constructing a two-track subway on such route, with stations at Massachusetts avenue, at Copley square, and at or near the corner of Boylston and Tremont streets, together with enlargement of the present Boylston street and Park street stations, as made up by the Chief Engineer of the Boston transit commission, amounts to the sum of $4,700,000; if instead of building below the present Tremont street subway between Boylston and Park streets the new subway is located

near the surface of the Common, west of the present subway, it is estimated that the above cost would be reduced to about $4,300,000. These figures compare with an estimated cost of constructing the Riverbank subway, as made up by the same engineer, of $3,700,000. The basis upon which such estimates are prepared is explained below.

Third, we find that the construction of a subway at the present time on such route would not "interfere with the future proper development of the transportation system within the metropolitan district," but would on the contrary be entirely consistent with such development.

Fourth, we find that such change of route at the present time from the route determined by or under chapter 573 of the acts of the year nineteen hundred and seven, namely, the Riverbank subway route, would not "result in such delay in the completion of said tunnel and subway as would be inconsistent with the public welfare."

The reasons which have led the joint board to reach the above conclusions will now be briefly presented, with certain explanatory statements. It must be borne in mind that the reference does not open up broadly the question what would be the best route for an east and west subway between the termini referred to, which might require consideration of the shortest and most direct line between them, namely, a route under Commonwealth avenue, the Public Garden and Boston Common. The inquiry is limited to a decision between the route now fixed by law and an alternative route located at least in part "under or near Boylston street." The joint board recognizes that each of these routes has some advantages and some disadvantages, and that any decision between them must be based upon an effort to give due weight to various opposing considerations. In making such comparison the demands of rapid transit, present and prospective street congestion, probable development of the city both commercial and residential, in the respective areas served and the territory contiguous thereto, construction costs and maintenance charges, and the effect on taxable property in the city of Boston are some of the important factors which have been considered, although not the only ones.

The construction of the Riverbank subway is already authorized by legislative act, and the joint board assumes that any repeal of this act will be made dependent upon action which will assure the construction of an east and west subway on another line. The exact route of the Riverbank subway has been determined, together with the number of stations thereon. This route is located in the Embankment, so-called, with the Charles River Basin on one side and a section now devoted to high-class residential uses on the other. This route is well adapted to secure rapid transit, its total length from the junction of Beacon street and Commonwealth avenue to Park street being about 9,800 feet, of which about 1,200 feet lies west of the subway entrance, in comparison with a length of 10,350 feet for the route above defined by Boylston and Tremont streets; but it affords relatively imperfect connections with any territory that is now or is soon likely to be devoted to commercial, industrial or public uses. The construction and use of such a subway will not in our opinion tend materially to increase tax values in the city of Boston.

The principal arguments in favor of such a route are first, its directness, and, second, the fact that it affords service to the area near the corner of Charles and Chestnut streets by means of a station at that point. These arguments are outweighed in our opinion by other considerations which favor a subway via Boylston street.

The whole territory along Boylston street, from Tremont street to Massachusetts avenue is rapidly developing for commercial uses, offering as it does a natural extension of the retail trade area of the city. The large tract of land on the south side of Boylston street, between Exeter street and the Boston & Albany railroad bridge, at present devoted to railroad purposes, presents an attractive and feasible field for future commercial expansion. In addition to Copley square itself, which is one of Boston's important civic centers, the whole area in this immediate territory is rapidly being devoted in part to religious, educational, social and amusement requirements. This square is now a centering point for many

surface lines of railway, and the rapid development of the Huntington avenue section to Massachusetts avenue and beyond is creating another largely used area. The people of the metropolitan district find increasing occasion to reach this section from all directions, and any comprehensive plan of rapid transit communication which undertakes to lay out a co-ordinated system adequate to meet future needs should include a subway under or near Boylston street with a station at Copley square and provision for a future subway connection with Huntington avenue as an important, if not an essential, element.

The route of the proposed Boylston street subway herein indicated will, in the opinion of the joint board, afford a ready means of rapid transit for this entire area, and at the same time serve the whole traveling public of the metropolitan district in a more satisfactory manner than the Riverbank route now fixed by law. There can be no question that the Massachusetts avenue and Copley square stations upon this route will be used much more largley than the stations on the Riverbank route located at Massachusetts avenue and at Dartmouth street, and will be of much larger public convenience.

We believe that developments which have taken place in the situation since the legislature of nineteen hundred and seven fixed the Riverbank route for an east and west subway have weakened the force of the arguments in favor of that line and have strengthened the arguments in favor of a Boylston street route as an alternative. One of these new elements is the substantial improvement of Boylston street, particularly from Dartmouth street to Massachusetts avenue and beyond, for various commercial purposes; another element is the increasing public use of Huntington avenue and contiguous territory from Copley square to the Boston Opera House, greatly increasing the importance and the convenience to the public of a subway station at Copley square.

Another new element which considerably weakens the force of the original argument in favor of the Riverbank route, namely, its directness for rapid transit purposes between the termini named in the act, is found in the fact that it has been decided within the last year that this subway should have three stations between its termini,— one at Massachusetts avenue, a second at Dartmouth street, and a third at the corner of Charles and Chestnut streets. This determination that the public interest requires that an east and west subway should not be built purely for rapid transit purposes between a central station in Boston and outlying or suburban districts strengthens the argument in favor of so revising the route of such a subway as to make the local stations of much greater public convenience and utility than they could possibly be on the Riverbank route.

A further consideration that makes for public convenience is the fact that a Boylston street subway reaches at the corner of Tremont and Boylston streets an important area largely developed for commercial, hotel and amusement purposes; by the proposed Boylston street route this area can be readily reached not only from the district between Dartmouth street and Massachusetts avenue but by travelers entering the rapid transit system from the west.

While general conditions are sufficient in our opinion to make this route the preferable one, they are supported by certain statistics that tend to confirm the views above stated. The joint board has had counts made, for the purposes of this report, of the number of passengers getting on and off the cars running between Park street and the junction of Beacon street and Commonwealth avenue at all stops on this route. These counts indicate that of the total passengers passing the latter point outward bound, less than 60 per cent. get on at Park street and more than 40 per cent. get on at intermediate points. Of the total number of passengers passing the same point inbound, apparently about the same proportion, or 60 per cent., go to Park street and 40 per cent. get out at points south or west of Park street. Therefore, about 40 per cent. of the travel between Boston and points to the west would be better accommodated by the Boylston street route than by the Riverbank route, while the 60 per cent. of through traffic would be accommodated substantially as well.

Such an estimate, however, is necessarily only approximate. Exact numerical statements in this matter are not possible, because although we may ascertain the total number of persons boarding and leaving the cars at each stop, it is impossible to find out the point from which each individual starts or to which he is going. The appended diagram shows graphically the result of these counts.

If the Riverbank route is retained it would seem that a sufficient number of cars would still have to be run over the present surface lines to accommodate the 40 per cent. (approximately) of the passengers desiring to go to or from points on Boylston street, i. e., only about 60 per cent. of the present surface cars would be run in such subway. If the Boylston street route is substituted there seems no doubt that a considerably greater number of surface cars could be taken from the street; owing to the fact that the proposed subway stations at Massachusetts avenue and at Copley square would better meet the convenience of a considerable number of passengers now using surface cars, a larger number of surface cars would be diverted underground.

Some modifications are possible in the Boylston street route as defined at the beginning of this report. In view of the complicated nature of some of the engineering problems involved, and of the fact that sufficient time has not been allowed for the completion of detailed studies, the joint board recommends that any act providing for the construction of a Boylston street subway should allow reasonable latitude in respect to the exact location.

Some of the data upon which the Chief Engineer of the Boston transit commission has prepared the estimates for the joint board may be given in tabular form, as follows:

Boylston Street Subway.

Total length of route	10,350 feet
Total length included within limits of stations	1,210 feet
Length of subway construction outside of stations	9,140 feet
Cost of stations and enlargements of existing stations:—	
New Park street station on lower level	$500,000 00
Enlargement of present Park street station	100,000 00
New station corner of Boylston and Tremont streets on lower level	280,000 00
Enlargement of present Boylston street station	180,000 00
Copley square station	200,000 00
Massachusetts avenue station	185,000 00
Total	$1,445,000 00
Cost of constructing 9,140 feet of subway outside of station limits, including land damages	3,255,000 00
Total cost	$4,700,000 00
Reduction in above total estimate if subway is located west of Tremont street subway on same level	$400,000 00

The length of this subway would be increased about 200 feet if constructed west of the present Tremont street subway.

Riverbank Subway.

Total length of route between same termini as Boylston street subway	9,800 feet
Length of route on surface	1,200 feet
Length of route in subway	8,600 feet
Total length included within limits of stations	1,275 feet
Length of subway construction outside of stations	7,325 feet

Cost of stations:—	
New station at Park street	$500,000 00
Station at Charles street	250,000 00
Station at Dartmouth street	180,000 00
Station at Massachusetts avenue	175,000 00
Total	$1,105,000 00
Cost of constructing 7,325 feet of subway outside of station limits, including land damages	2,595,000 00
Total cost	$3,700,000 00

With reference to delay, after signature of lease a contract for a section of the Riverbank subway might be let in about two months, and a similar contract for a section of the Boylston street subway, which would require some field work, in three or four months. Either subway might be completed in about two or two and a half years from date of beginning construction, assuming no legal delays to intervene.

Suggestions of applications for injunctions or other legal proceedings by private interests affected along either route should not in our opinion control a decision of the question of route upon its merits. If an act authorizing the construction of the Boylston street subway on the route above defined provides for the payment of any damages to property rights, if any such exist, which may be suffered through the location in Commonwealth avenue of the open cut giving entrance to the subway, we do not believe that possibilities of delay through legal proceedings need influence the decision of the legislature.

The only remaining question is the attitude of the Boston Elevated Railway Company. The joint board has not considered that it was called upon under the terms of the reference to endeavor to secure from this Company a formal statement as to its willingness to give up its present legal rights, which are of course well known to the legislature, in respect to the construction and lease of the Riverbank subway. We have assumed from the terms of the resolve that the legislature desired the question of the preferable route to be considered by the joint board regardless of the attitude of the Company, leaving this question to be dealt with by the legislature itself.

We believe, however, in view of the important bills now pending before the legislature affecting the future status of the Boston Elevated Railway Company in relation to consolidation with the West End Street Railway Company, extension of leases, and building of additional subways, that it should be possible to make some arrangement which would secure final action by the company within a short period of time in respect to acceptance by it of a change of route, and which would insure the early building of the east and west subway upon such route as the legislature finally determines to be the most desirable.

Mr. George G. Crocker on account of interest did not sit with the joint board in the consideration of this resolve. Mr. Horace G. Allen dissents and files a minority report.

WALTER PERLEY HALL, *Chairman.*
GEORGE W. BISHOP.
CLINTON WHITE.
Board of Railroad Commissioners.

GEORGE F. SWAIN.
JOSIAH QUINCY.
JAMES B. NOYES, *Secretary.*
Boston Transit Commission.

MAY 1, 1911.

BOSTON, MASS., May 1, 1911.

To the Senate and House of Representatives:

As I am unable to agree with the conclusions reached by the majority of the joint board I wish to state my reasons for dissenting from the report.

The general court asks three questions:

First, whether a two track subway between the junction of the three roads and Park street, having a route in part under or near Boylston street, would be preferable to the Riverbank subway authorized by section 1 of chapter 573 of the acts of the year 1907.

Second, whether the construction of such a subway would interfere with the future proper development of the transportation system.

Third, whether a change of route, at the present time, would result in such delay in the completion of the subway as would be inconsistent with public welfare.

I will answer these questions in the order above stated.

First, the Riverbank subway was authorized as a substitute for the east-side subway, so-called, and at the time the statute was passed the legislature must have considered that there were sufficient public reasons for the construction of such a subway. I will refer to some of these reasons:

(*a*) It would form a direct and rapid route for all persons arriving at the junction of the three roads desiring to go to Park street.

(*b*) It would afford transit facilities to a section of Boston, east of Massachusetts avenue and north of Commonwealth avenue which is substantially without transit facilities of any kind.

(*c*) It would entirely relieve congestion upon the surface of Boylston street for many years.

(*d*) In connection with the Cambridge subway it would relieve the long continued and constantly increasing congestion at the present Park street subway station.

I consider that the foregoing reasons exist to-day, are sound, and are as convincing as when the act was passed in 1907.

(*a*) The majority report concedes that about 60 per cent. of the passengers in cars at the three roads desire to be carried to Park street. We therefore have at present a majority of the traveling public upon such lines who will be accommodated better by the Riverbank subway than by any suggested substitute. I believe that the rapid future development along such lines west of the three roads will materially increase this percentage.

In considering the 40 per cent. of passengers which the majority report finds leave the surface cars between the three roads and Park street, it should be borne in mind that this percentage includes all who are going to the South station or its vicinity and now are obliged to obtain transfers, to leave the car at the station at the corner of Boylston and Tremont streets, and to take a surface car to their destination. There are upwards of 1,300 such passengers each way, each day. All of these passengers would be much better accommodated by being taken to Park street and there connecting with any future subway which may be authorized to the South station. Further deductions should be made from this 40 per cent. of the passengers at the three roads who do not wish to go to Park street, as follows:

1. The inward bound passengers who leave the car at Charlesgate East, corner of Beacon street and Massachusetts avenue, or the stop on Massachusetts avenue between Marlboro street and Commonwealth avenue,— for the reason that these passengers would be as well or more conveniently served by the Riverbank subway. A count taken by the joint board shows that there are over 1,300 of such passengers a day.

2. The inward bound passengers leaving the car on Massachusetts avenue between Commonwealth avenue and Newbury street and at the corner of Massachusetts avenue and Boylston street,— because to these passengers the advantages of a subway along the route proposed by the majority report, as compared with the short haul on the surface, in the absence of congestion, would be trifling, and the convenience of such pas-

sengers should not weigh in favor of the proposed substitute. A count taken shows that there are over 2,850 such passengers a day.

It is therefore apparent that so far as serving the passengers who come to the three roads, an overwhelming majority would be as well or better served by the Riverbank subway.

(*b*) It must be conceded that the Riverbank subway would more conveniently serve people desiring to go to or from the region north of Commonwealth avenue, including those who would use the proposed station at Charles street, than a Boylston street subway. While it is true that this section at present is occupied principally for residences, it is equally true that such residents and a very large number of professional men doing business and receiving patients there, as also residents of that portion of Beacon hill and the West End contiguous to the Charles street station, have a right to better transit facilities than are now afforded them. Among the protests received by this joint board were several from people who had purchased property in this section for improvement and investment, relying upon the provisions of the Riverbank act, the same having been accepted by the railway company. I believe further that the portion of the Riverbank just completed between Massachusetts avenue and Charles street should have transit facilities such as will be afforded by the Riverbank subway.

I now wish to consider what substitute the majority has found preferable to a Riverbank subway. The route considered is not accurately defined, but substantially it is a two-track subway with an incline in Commonwealth avenue at its junction with Beacon street, thence under the Fenway, Newbury street, Boylston street, and under or adjacent to the present subway from Church street or thereabouts to Park street, with stations at Massachusetts avenue, Copley square, and at the corner of Boylston and Tremont streets. Such a route is about 1,750 feet longer and the estimated cost is $1,100,000 greater. Such a subway would relieve the congestion at Park street and, for the time being, the congestion on Boylston street, but would not, in my opinion, affect the taxable value of the land on Boylston street now used by the Boston & Albany Railroad as a train yard, nor the taxable value of any property in Copley square, nor of that between Copley square and Tremont street. The taxable value of this region undoubtedly will rise and the territory adjacent, particularly along Huntington avenue, will greatly increase in value and rapidly develop but, in my opinion, it will not be because of the construction of a two-track subway in Boylston street, with stations as proposed in the joint board's report. It will be a development which will soon demand proper and adequate transit facilities, far greater in scope than those now proposed in the report of the majority. I cannot believe that the proposed subway route, with stations as indicated in the report, will satisfy the Boylston street owners and merchants who have been most earnest in their opposition to the Riverbank subway, as it is difficult to see what good such a subway can do business interests on Boylston street between Clarendon and Tremont streets. Passengers at the three roads desiring to leave the car between Copley square and the corner of Tremont and Boylston streets would be much better served by transit on the surface without congestion, leaving the car at their exact destinations, than by being obliged to go to the surface and walk from the nearest subway station. For the foregoing reasons, and because I believe that the Riverbank subway has been needed for years, and that a proper subway in Boylston street, as hereinafter referred to, will be needed in the future, I cannot assent to the proposition that the legislation authorizing the former should be repealed and that a substitute should be provided at this late day.

Second, would the proposed subway in Boylston street interfere with the future proper development of the transportation system?

In my opinion it would, most seriously. There is at present an increasing need for a two track subway for passengers arriving at the three roads. Any proposition to locate such a subway where it would interfere, in any way, with a proper subway or subways to accommodate Boylston street and Huntington avenue traffic in the future, in my opinion, would be a mistake. A two track subway from the three roads constructed at once

will not more than meet the present and future growth of traffic using it. Any proposition to have it bear the Boylston street and Huntington avenue traffic, in addition to its own, would be unreasonable from a public standpoint and the existence of the subway proposed in Boylston street would necessarily interfere with provision which must be made in the future for a proper handling of the Boylston street and Huntington avenue traffic. There is an immense territory within the limits of the city of Boston adjacent to the western part of Boylston street and Huntington avenue, and it is a territory which, when developed, will require all the space under Boylston street between Copley square and the Common which should be reasonably availed of for transit purposes.

Third, would a change of route result in delay inconsistent with the public welfare?

I answer that, in my opinion, it would do so. It is of course a question which must be answered by individual judgment. I have founded my opinion upon a consideration of certain facts and from the lessons of experience. As has been said, the proposed subway is about 1,750 feet longer than the Riverbank. This, however, does not prove that one would take longer to build than the other,— although such might well be the case with reasonably economical construction. But it must be apparent that reasonable construction of the Riverbank subway can proceed with much greater speed than such a construction of the Boylston street subway. The former will be open-cut, with an opportunity to work day and night to a point near Charles street, and thence by tunnel under the hill in which work can be carried on day and night; with the exception of adjusting sewer outlets, it is substantially free from the costly and slow process of removing and rebuilding sewers and their connections, removing and relocating waterpipes, and overcoming the difficulties which are always met with in excavating under city streets. The Boylston street subway, built with a proper regard for the rights of the public on the surface of the street, would necessitate a cessation of day work, in whole or in part, in sections under Boylston street, and would encounter far greater obstacles and difficulties than would be found in the construction of the Riverbank subway. Passing from these material differences, we should consider what experience has taught us in the matter of delay. The Riverbank subway act was approved June 28, 1907, and was to take effect upon its acceptance by the railway company within two months after its passage. It was accepted by the railway company on July 26, 1907. Its construction could not be begun without the assent of the railway company until the expiration of a year from the completion of the Washington street tunnel. This tunnel was opened November 30, 1908. The company was asked to consent to the beginning of construction earlier, and, entirely within its rights, did not give such assent. Delays were occasioned by questions arising as to the location of the western terminus. The decision of the Boston Transit Commission fixing the stations was appealed from and finally confirmed by the Board of Railroad Commissioners, and, on April 22, 1910, a rough draft of the contract for the proposed use of the Riverbank subway was sent to the Boston Elevated Railway Company for its alteration or suggestions. Probably on account of the agitation for the repeal of the Riverbank act, no alterations have been suggested or made as yet by the company, nor has the contract been executed. With the exception of the provision as to beginning work, I know of no reason why practically all of these delays and others may not occur before beginning the construction of a substitute for the Riverbank subway. I have not the slightest criticism to make of any of these delays. I assume they all were legal, proper and necessary, but I point them out merely as instances of what may happen to prevent the beginning of work upon a subway after the same has been duly considered, found necessary, and authorized by the legislature. Matters preliminary to executing a lease and beginning work on the Riverbank subway have been pretty well threshed out and it is undoubtedly true that if the contract is executed by the company, actual work may be begun within sixty days and completed in about two years.

The report of the majority states that a contract for a section of the Boylston street subway might be let in three or four months after the execution of a lease. It seems to me that this has no bearing upon the question at issue, and I do not find in the report even a prediction as to what time would probably elapse between the passage of an act authorizing a substitute and the actual beginning of construction. This is a question in which the public is particularly interested. The report states "in view of the complicated nature of the same and the engineering problems involved and of the fact that sufficient time has not been allowed for the completion of detailed studies, the joint board recommends that any act providing for the construction of a Boylston street subway should allow reasonable latitude in respect to the exact location." Reasonable latitude, although sometimes and, perhaps, always necessary in subway legislation, usually causes delay. On any substitute the legislature or the Boston transit commission will have to consider and act upon the same questions considered in connection with the Riverbank subway, the exact location of the subway, the consent of the company, the location of the western terminus or incline, the number and positions of stations, the extensive changes which would be required in the present Boylston street and Park street stations. All of these would have to be determined. The rights of the railway company to appeal from decisions of the transit commission should be as carefully guarded as in previous acts. Moreover, it should be noted that the findings of the majority report, that the construction of a substituted subway might be begun in three or four months after signing a lease, is on the assumption that no "legal" delays intervene. The transit commission, in considering the question of the western terminus of the Riverbank subway, had called to its attention several questions of law bearing upon the location of an incline within the lines of Commonwealth avenue, and it is not necessary to decide that such contentions are legal or illegal in order to appreciate that actions to determine the same might cause serious delay in the completion of the subway.

I have no knowledge as to whether the assent of the railway company to a Boylston street route might be obtained "in view of the important bills now pending before the legislature affecting the future status" of the company. We were not asked to obtain such assent or to express our opinion upon the matter. It certainly can have no bearing upon the question whether the Boylston street route is preferable to the Riverbank from the view point of the public.

HORACE G. ALLEN.

APPENDIX D.

[CHAPTER 52.]

RESOLVE RELATIVE TO THE REMOVAL OF THE ELEVATED RAILWAY STRUCTURE BETWEEN THE NORTH STATION AND SULLIVAN SQUARE IN THE CITY OF BOSTON.

Resolved, That the Boston transit commission shall include in its next annual report an approximate estimate of the cost of removing the elevated railway structure between the north station and Sullivan square in the city of Boston, and of the substitution therefor of a subway. [*Approved April 14, 1911.*

APPENDIX E.

THE COMMONWEALTH OF MASSACHUSETTS.

To the Senate and House of Representatives.

Chapter 58 of the Resolves of the Legislature of 1910 is as follows:—

RESOLVE TO PROVIDE FOR AN INVESTIGATION RELATIVE TO THE CONSTRUCTION AND USE OF SUBWAYS IN THE CITY OF BOSTON.

Resolved, That the board of railroad commissioners and the Boston transit commission, acting as a joint board, shall consider and investigate the subject-matter of the petitions of Edmund D. Codman and others, with accompanying bills, House, Number 45 and Number 46, relative to the construction and use of subways in the city of Boston, and shall report in print thereon to the general court not later than January first, nineteen hundred and eleven. The members of the said joint commission shall receive no extra compensation for their services, but the commission may expend a sum not exceeding five hundred dollars in carrying out the provisions of this resolve. [*Approved April 8, 1910.*

In compliance with the above resolve, the Board of Railroad Commissioners and the Boston Transit Commission, sitting as a Joint Board, make the following report:—

A public hearing, duly advertised, was held at the office of the Transit Commission, July 7, 1910. At this hearing it appeared that the petitioners were not ready to present their case. Another hearing, therefore, also duly advertised, was held September 27, and adjourned to October 11. At still other hearings given by the Joint Board the matters involved in this resolve were further discussed, either by those in favor of or by those opposing the petition, and the Joint Board has also had studies and estimates made, to assist it in considering the subject.

In order to understand clearly the bearing of these bills upon the transportation situation, a brief historical statement is desirable.

Under chapter 500, Acts of 1897, the Transit Commission was authorized to build for surface cars "an incline, open cut and subway, beginning at a point on Cambridge street, near North Russell street, upon, through and under Cambridge street, Bowdoin square and Court street to a junction at Scollay square with the subway."

It was also provided that in case the Transit Commission should determine that said subway might advantageously be extended nearer to Charles River than North Russell Street it could be so extended, and Cambridge Street was to be widened opposite the incline to such width as necessary to make the highway thirty feet wide on each side for a distance not less than thirty feet nor more than one hundred feet beyond the end of the open incline.

This legislation was modified by chapter 520, Acts of 1906, which provided that the terminus of the subway for the accommodation of the cars from Cambridge should be either at Park Street or at Scollay Square, and this law imposed upon the Transit Commission the duty of deciding which of these points should be the terminus. In accordance with this act the Transit Commission gave a duly advertised public hearing upon this matter on Dec. 18, 1906. The sentiment expressed at this hearing was overwhelmingly in favor of placing the terminus at Park Street, only two persons appearing in favor of placing it at Scollay Square. After careful consideration, the Transit Commission, on Feb. 14, 1907, fixed the terminal at Park Street, for the following reasons:—

1. Because the location of the terminal on the Common afforded a large open space from which incoming passengers could distribute themselves in whatever direction they desired to go; whereas Scollay Square afforded no such opportunity for distribution, and was likely to become congested in the future by the natural increase of business there, and because Scollay Square was the terminus of the subway loop from the north, of the East Boston tunnel, and was also a station on the through tracks of the Tremont Street subway. The passengers from all these transportation lines would be brought upon the surface, to overcrowd the narrow sidewalks and street crossings at Scollay Square.

2. Because public sentiment appeared to be overwhelmingly in favor of this location.

3. Because the Elevated Railway Company, the lessee, strongly favored this location.

Subsequent to this decision, Mr. E. D. Codman and other property owners in the North End, who had not appeared at the advertised hearings of the commission, believing that the location of the terminus at Park Street would injure their property and prove a detriment to the development of the northwestern section of the city, presented a petition to the Legislature of 1909, asking that the commission be required to change the Boston terminal of the Cambridge connection from Park Street to Scollay Square. The petitioners were given leave to withdraw.

Subsequently a bill in equity was filed in the Supreme Court, asking the court to enjoin the commission from constructing the terminal at Park Street, various grounds being assigned, some of which involved the constitutionality of the act. The matter was heard before a single justice of the Supreme Judicial Court, and by him reported to the full bench. As the commission had, on April 6, 1909, accepted a bid for the construction of the greater part of the tunnel under Beacon Hill, leading to the terminus at Park Street, it made every effort to obtain an early determination by the court. On Sept. 11, 1909, the opinion of the court was delivered, dismissing the bill with costs, and sustaining all the positions of the commission. The pendency of this bill resulted in delaying the prosecution of work upon the Cambridge connection for more than five months.

In a further endeavor to rectify what the petitioners believed to have been the unwise decision of the commission, and with the object of providing the West End with additional subway transportation facilities, House Bills Nos. 45 and 46 were presented to the Legislature of 1910 by E. D. Codman and others.

Briefly stated, these bills provide that the two tracks coming from Cambridge through the Cambridge subway and over the Cambridge bridge, after passing under the hill to the terminus at Park Street, shall be continued northerly under the present subway in Tremont Street, and under the station at Scollay Square, with a sub-station at that point; thence under Court Street to Bowdoin Square, with a station at that point; thence under Cambridge Street; then emerging from the subway, passing on to an elevated structure and joining the already authorized elevated structure at or near Charles Street, thus forming a double-track loop at the Boston end of the Cambridge rapid transit line.

The Joint Board has carefully studied the proposition contained in these bills, with the earnest desire of justly estimating the needs of the district in question, and the possible advantages of the route suggested.

It is urged in favor of the loop that when the Cambridge subway is opened, with a terminal at Park Street, many of the surface cars now running along Cambridge Street and other streets in the neighborhood will be removed, thus diminishing the transit facilities of the district; and, further, that the district will have no direct connection with the rapid transit system of Boston. It is urged that the building of the loop would enable cars to be run in both directions around the loop; that it would result in the improvement of property; that it would not be inconsistent with the design of a proper station at Park Street; and that it would afford needed transportation facilities in the West End. It is further maintained, and figures are presented substantiating the claim, that property has

diminished in value within the last few years in the district in question; that rents are lower; that business is moving away, and that the profits of business are less: and it is urged that this is due to a lack of transportation facilities, which would be provided by the proposed loop. This is the sum and substance of the argument in favor of the loop.

It is, of course, of great importance in planning and executing a transportation system that a careful study should be made of the condition, tendencies and needs of the various sections of the city, and, if possible, that any changes and improvements made should benefit all sections, and injure or retard the growth of none. It must be recognized, however, that there are many other elements beside transportation which affect the increase or decrease of real estate values, and the advantages or disadvantages of one section over another as a place of business. Easy and convenient means of access to a district is, of course, of importance; but this alone will not improve values. Indeed, the increase or decrease of values seem sometimes to be governed by laws which are entirely fortuitous, or mere matters of chance or sentiment. One portion of a city will develop, and real estate values will improve; while another portion, apparently more favorably situated, will pursue the opposite course. Abundant illustration of this would be afforded by a study of the development of any large city.

The presence of a subway running under the streets of a district will not, of itself, improve the district. Much depends upon where the stations are located, how far apart they are, and, more than all, whether large numbers of people want to go to that district. A subway without stations would be of no benefit, but rather the reverse; and, unless rapid transit is desired, or the congestion of travel is very great, a subway with stations at considerable distances apart will not promote the growth of a district as well as a system of surface lines, in which the cars stop at every corner. Obviously, a subway or elevated system should have stations only at relatively considerable distances apart, compared with the distance between stops of surface cars. Stations are very expensive to construct and maintain, and frequent stops diminish capacity and speed of trains or cars. A subway is justified by two conditions:—

1. When the congestion on the surface of the streets is so great that travel in the surface lines is seriously interfered with and delayed.

2. Where the distances to be traversed are so great that some means of more rapid transit than can be permitted on the surface, even with uncongested streets, is necessary or desirable.

Such a construction is not justified solely for the initial development of traffic in a district in which it does not already exist. Surface cars would serve such a district, and it would not be until a surface system should prove inadequate, on account of its many stops and the congestion in the streets, that relief should be sought in a subway or elevated system. If more people wish to go to or from a given district than can be properly and speedily accommodated by a surface system, then, and then only, is the expense of a subway or elevated system justified.

A subway with stations at comparatively long intervals has the inevitable effect of increasing real estate values in the neighborhood of the stations, in comparison with values at intermediate points. With a surface car system no such disparity exists. With adequate surface transportation values increase or diminish in accordance with the other advantages or disadvantages of the locality.

The proposed loop would have stations only at Charles Street, Park Street, Scollay Square and Bowdoin Square. There would probably be no station between the latter point and Charles Street. The proposed loop would also involve an elevated structure for a certain distance along Charles Street, and the widening of that street at the entrance to the subway. If large numbers of people wished to go to Bowdoin Square, it would afford them convenient means of doing so, but it would probably be an injury to some parts of the West End, and would not give as good facilities for local transportation as the surface cars. It would hardly result in the building up of the district around Bowdoin Square into a large

or important trading district. The trend in this section of the city seems to be in another direction, and transportation facilities cannot artificially counteract such tendencies.

The loop would furthermore result in duplicating the most expensive portion, and at present the least-used portion, of the Tremont Street subway, namely, the portion between Park Street and Scollay Square. This section of the existing subway is at present used to much less than its full capacity, and, considering the great expense of subways and the urgent demands for them in sections of the city where none exist at present, it would be unfortunate to duplicate this section unnecessarily at large expense. The loop, besides the disadvantages which have been enumerated, would have the additional disadvantage that it would involve a grade crossing of the tracks at the junction near Charles Street.

Scollay Square will continue to be needed and used, to as great an extent as the sidewalk facilities in the neighborhood will allow, as a through station on the Tremont Street subway, as the terminus of the East Boston tunnel and as the terminus of the northern loop of the subway, around which cars run from East Cambridge, Somerville, Chelsea, Everett, Revere, Lynn and other points on the Boston & Northern Street Railway lines. The congestion at the present time on the sidewalks surrounding Scollay Square and in the neighboring streets is so great that to move at all rapidly it is often necessary to walk in the street.

Considering all the arguments which have been recited, the Joint Board is unable to conclude that the reasonable demands of transportation require the construction of the proposed loop. The opening of the Cambridge subway will undoubtedly reduce some of the traffic through Cambridge Street, and will probably lead to a reduction in the number of surface cars necessary. That neighborhood, however, is entitled to, and should receive from the Elevated Railway Company, such facilities for transportation by surface cars as it requires. If this is given, it seems to the Joint Board all that can reasonably be asked.

The district in question is small in area, and no part of it is at present, as compared with conditions in other cities, very far from surface car, subway and elevated transportation. Appended to this report is a map of the district, showing the surface lines and the number of cars per hour at present running through it; also a count of cars and passengers passing over Cambridge and Harvard bridges, made by direction of the Joint Board. It is apparent from this map that no portion of the district is more than 750 feet from some transportation line.

It is always possible, of course, to improve transportation facilities. There is, however, a reasonable limit to such improvement. It is not possible to provide transportation from every point to every other point without change; and local conditions, such as topography, width of streets, character of the district, etc., will lead to necessary differences in the accommodation furnished to different sections. An increase in transportation facilities would not build up this district into one like the so-called shopping district of Boston.

Finally, if further facilities prove to be needed in this district, the best way to furnish these, in the opinion of the Joint Board, would not be by the construction of the proposed loop, but rather by an extension of the East Boston tunnel. The terminus of this tunnel will probably be, at some future time, by means of a loop underneath the present Scollay Square station. If desired, however, the East Boston tunnel tracks might be extended and the loop placed in Bowdoin Square, or around some block or blocks in that vicinity, as, for instance, by running one track westerly down Green Street, thence through Chambers Street and easterly through Cambridge Street. The Joint Board does not, however, recommend any such extension at the present time, considering the very small extent of the area in question. The distance from Scollay Square to Bowdoin Square is only 1,150 feet, and from Bowdoin Square to Charles Street 2,350 feet. With surface cars running through this district, as shown by the accompanying map, it would seem that the transportation facilities might be considered fairly adequate.

In connection with its consideration of the subject-matter of this reference, the Joint Board heard the advocates of certain other proposals with respect to rapid transit which it was claimed might affect its conclusions, deeming it proper that such proposals, though outside of the scope of the bills themselves, should be considered. The conclusions herein stated are not to be regarded as an expression of opinion as to the merits of these proposals.

The Joint Board, therefore, recommends no legislation on the bills which are the subject of this report.

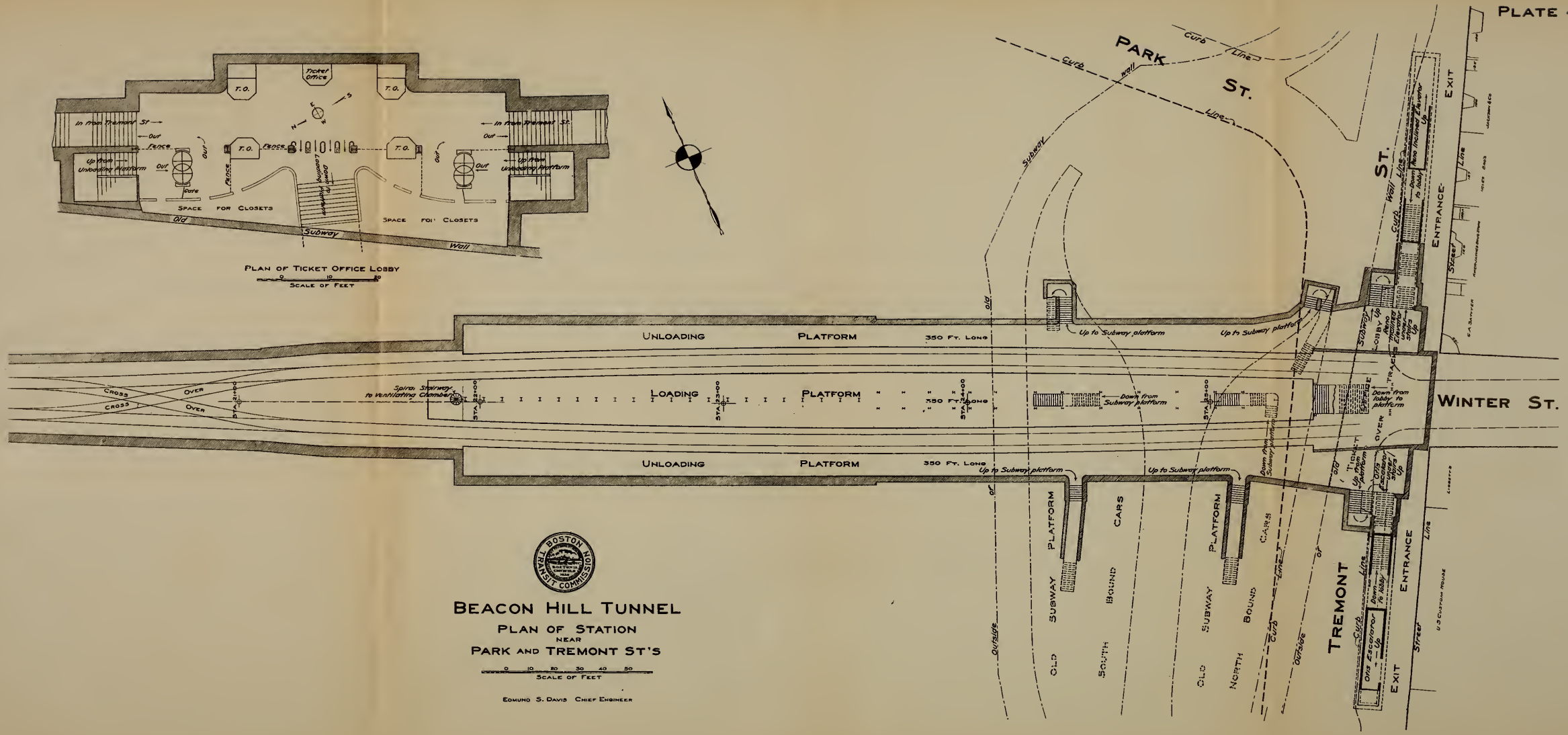
In this connection the Joint Board, in view of the present congestion in the Park Street station at rush hours, deems it proper to state that existing accommodations can readily be increased to such extent as may be desired by extending the platforms towards the south. This station was originally planned to occupy in width as much space under the Common as was permitted by law, and its length was determined by an estimate of the area required for probable business and by a desire to avoid injury to a line of old elms then supposed to be in good condition, but shortly thereafter discovered to have been so rotted by age that safety required their removal. An enlargement of the station, if desired, can now be executed advantageously in connection with the building of the new station for the Cambridge line. Such enlargement will require special legislative authorization, and the assent of the West End Street Railway Company as lessee and of the Boston Elevated Railway Company as assignee of the lease will also be necessary. It should be borne in mind that the present congestion will in any event be materially relieved when the new subway line to Cambridge is opened, and later when the proposed Riverbank subway to the west is constructed, as each of these subways will have independent platforms, entrances and exits.

This report is unanimously submitted, except that Mr. George G. Crocker, on account of interest, did not sit with the Joint Board in the consideration of this resolve.

WALTER PERLEY HALL, *Chairman*,
GEORGE W. BISHOP,
CLINTON WHITE,
Board of Railroad Commissioners.

GEORGE F. SWAIN, *Secretary*,
HORACE G. ALLEN,
JOSIAH QUINCY,
JAMES B. NOYES,
Boston Transit Commission.

DEC. 31, 1910.


Ticket Office
T.O.
In from Tremont St
Out
Fence
Up from Unloading Platform
Gate
Space for Closets
Old Subway Wall
Plan of Ticket Office Lobby
Scale of Feet
Park St.
Curb Line
Wall
Subway
Unloading Platform 350 Ft. Long
Loading Platform 350 Ft. Long
Cross Over
Spiral Stairway to Ventilating Chamber
Up to Subway platform
Down from Subway platform
Old Subway Platform
South Bound Cars
North Bound Cars
Tremont St.
Entrance
Exit
Winter St.
Lobby Up
Down from Tickets to platform
Up from platform
Office Lobby Up
Down to lobby
Boston Transit Commission
Beacon Hill Tunnel
Plan of Station
near
Park and Tremont St's
Scale of Feet
Edmund S. Davis Chief Engineer

Maximum hour and total Round Trips for 24 hours: thus
Maximum Normal Total Trips
12 4 86 [Data furnished by Boston Elev. Ry. Co. Nov. 22 1910]
CHARLES RIVER EMBANKMENT
CAMBRIDGE BRIDGE
MAX. NOR. TOT. 99 35 794
MAX. NOR. TOT. 35 17 371
CHARLESBANK
8 4 86
CHARLES 8 4 86 MAX. NOR. TOT.
MASS. GEN. HOSPITAL
MAX. NOR. TOT. 51 27 543
MAX. NOR. TOT. 43 23 457
PASSENGER STATION FOR STEAM RAILROADS
NORTH STATION
TRAINS NORTH EAST & WEST
MAX. NOR. TOT. 84 59 949
MAX. NOR. TOT. 33 15 316
MAX. NOR. TOT. 61 50 774
MAX. NOR. TOT. 86 36 744
MAX. NOR. TOT. 90 40 811
MAX. NOR. TOT. 90 40 811
MAX. NOR. TOT. 90 40 811

SUMMARY OF COUNT OF CARS AND PASSENGERS, 7 A.M. TO 7 P.M., MADE BY DIRECTION OF THE JOINT BOARD.

Harvard Bridge. (*Counted Sept. 21, 1910, Weather Fine.*)

	Cars.	Passengers.
West-bound.		
Dorchester and Roxbury[1] cars, ... Maximum hour,[2] 5.10 to 6.10 p. m.; 32 cars, 1,056 passengers.	215	4,109
Subway[1] cars, ... Maximum hour,[2] 5.10 to 6.10 p. m.; 57 cars, 2,688 passengers.	413	11,567
Total west-bound, ...	628	15,676
East-bound.		
Dorchester and Roxbury[1] cars, ... Maximum hour,[2] 5.10 to 6.10 p. m.; 32 cars, 1,265 passengers.	228	6,442
Subway[1] cars, ... Maximum hour,[2] 7.20 to 8.20 a. m.; 41 cars, 1,576 passengers.	402	10,554
Total east-bound, ...	630	16,996

Cambridge Bridge. (*Counted Sept. 22, 1910, Weather Fine.*)

West-bound.		
Cambridge Street cars, ... Maximum hour,[2] 5.30 to 6.30 p. m.; 82 cars, 3,359 passengers.	511	10,475
Charles Street cars, ... Maximum hour,[2] 5.00 to 6.00 p. m.; 16 cars, 482 passengers.	88	1,518
Total west-bound, ...	599	11,993
East-bound.		
Cambridge Street cars, ... Maximum hour,[2] 7.40 to 8.40 a m.; 64 cars, 2,064 passengers.	499	11,470
Charles Street cars, ... Maximum hour,[2] 4.10 to 5.10 p. m.; 15 cars, 528 passengers.	85	1,809
Total east-bound, ...	584	13,279

[1] The division of cars into "Subway" and "Dorchester and Roxbury" groups is proportioned from the total count by actual count between 1.30 and 7.00 p. m.
[2] "Maximum hour" gives the maximum number of passengers carried in one hour.

APPENDIX F.

THE COMMONWEALTH OF MASSACHUSETTS.

To the Senate and House of Representatives.

Chapter 94 of the Resolves of the year 1910 reads as follows:

RESOLVE TO PROVIDE FOR AN INVESTIGATION RELATIVE TO THE CONSTRUCTION OF A SUBWAY FROM PARK STREET TO THE SOUTH STATION IN THE CITY OF BOSTON.

Resolved, That the Boston transit commission is hereby authorized and instructed, after an appropriation sufficient to cover the expense of the same, as estimated by it, has been made by the city of Boston, to make studies, plans and estimates of cost for the construction of a subway from the present subway station at Park street to the South station, with proper terminals and connections, and to report in print to the general court, on or before the first Wednesday of January in the year nineteen hundred and eleven, the draft of a bill for the construction of such subway. [*Approved May 11, 1910.*

By chapter 139 of the Resolves of the year 1910, the Board of Railroad Commissioners was added to the Transit Commission, to constitute a Joint Board under this resolve.

On July 19, 1910, the city council of Boston appropriated the sum of $4,000 to cover the expense of the investigation, such sum having been estimated as requisite therefor.

Thereupon this Joint Board employed Mr. Edmund S. Davis, the acting chief engineer of the Boston Transit Commission, to make studies, plans and estimates of cost of the proposed subway. His report is submitted herewith as Appendix A.

House Bill No. 659, submitted to the Legislature of 1909, gave the Transit Commission authority to construct a tunnel between Park Street and the South Station. This bill, together with others relating to transportation in the metropolitan district, was, by chapter 94 of the Resolves of the year 1909, approved May 19, 1909, referred to this Joint Board for investigation and report, and this Joint Board submitted its views in Senate Document No. 28 of the year 1910, to which reference is hereby made.

In that report this Joint Board discussed in some detail the existing facilities for reaching the South Station, and concluded its report as follows:—

The foregoing statements show the surface system of transportation to and from the South Station as at present provided by the Boston Elevated Railway Company. It is, however, clear that there is a legitimate demand for a quicker and easier means of transportation between this point and several of the centers of metropolitan Boston. This can best be satisfied, in our opinion, by a subway or tunnel connecting the present Tremont Street subway and the Washington Street tunnel with the South Station. In view of the proposed terminus of the Cambridge rapid transit line at Park Street, it is our opinion that an extension of this line to the South Station is a logical development. If constructed, this extension would obviously run under Winter Street, securing a station connection with the Washington Street tunnel and thence under Summer Street to the station.

While we are of opinion that under present conditions the Boston Elevated Railway Company ought not to be called upon to assume additional large obligations arising from the construction and operation of new elevated structures, subways and tunnels radiating to the suburbs

of Boston, it by no means follows that its rapid transit system ought not to be extended by some sub-surface structure in the heart of the city itself. Such a connection is the one proposed in substance in House Bill No. 659, which, if constructed, would co-ordinate the existing lines of the company and create a direct, rapid and easy means of connection between the largest passenger terminal in the city of Boston and the territory now served by the Washington Street tunnel and the Tremont Street subway. While the provisions of existing law secure to the Boston Elevated Railway Company certain rights with respect to additional burdens, we are of opinion that studies should be made by the Boston Transit Commission, having for their object the construction of this tunnel. Those studies should embrace the selection of a route, the development of the Park Street station, a connection with the Washington Street tunnel and a terminal station at or near Atlantic Avenue. Further study also should be made, in connection with this investigation, of the expenses of construction, and, so far as possible, the land damages to be paid. This investigation should be seasonably prosecuted, and a report made to the General Court not later than Jan. 1, 1911. If it shall appear that no unforeseen obstacles of construction are disclosed, and that the total estimate of expense is not too great, permissive legislation should be enacted for the construction of this subway. For this purpose the Joint Board recommends to the General Court the passage of the following resolve.

The resolve under which this report is made is in the form recommended.

Since the previous report of this Joint Board a contract has been entered into for the construction of the Park Street station of the Cambridge tunnel. This station has been designed so as to allow the extension of the tracks down Winter and Summer streets, passing under the Tremont Street subway and the Washington Street tunnel, having connections with each.

The studies indicate that no special difficulties will be encountered in the extension of the Cambridge tunnel to the South Station, and that convenient connections can be made with the Tremont Street subway, the Washington Street tunnel and the South Station. For further information reference is made to the report and plan submitted by the engineer.

The estimated cost of this extension, with stations, connections and other appurtenances, is $2,600,000, not including land damages. This estimate is slightly lower than the rougher estimate submitted with the report of last year. The only expense for land damages will probably be for entrances and exits for the station near Washington Street, and the amount of damages therefor cannot be estimated until the locations for such entrances and exits are determined. The total amount of such damages will probably be only a small percentage of the cost of construction.

In accordance with the opinion expressed in its report of last year, this Joint Board is of the opinion that the demands of traffic and the congestion of the streets leading to the South Station are such as to render now desirable the passage of permissive legislation for the construction of this subway, and it presents herewith, as Appendix B, a draft of a bill for that purpose.

The above report is unanimously submitted.

GEORGE G. CROCKER, *Chairman*,
GEORGE F. SWAIN, *Secretary*,
HORACE G. ALLEN,
JOSIAH QUINCY,
JAMES B. NOYES,
Boston Transit Commission.

WALTER PERLEY HALL,
GEORGE W. BISHOP,
CLINTON WHITE,
Board of Railroad Commissioners.

JAN. 4, 1911.

APPENDIX A.

BOSTON TRANSIT COMMISSION,
15 BEACON STREET, BOSTON, Dec. 7, 1910.

PROPOSED SUBWAY FROM PRESENT SUBWAY STATION AT PARK STREET TO SOUTH STATION.

To the Joint Commission constituted by Resolves of 1910, Chapters 94 and 139.

GENTLEMEN:—With reference to chapter 94 of the Resolves of the Massachusetts Legislature, session of 1910, I beg leave to report that preliminary studies, plans and estimates of cost have been made, in compliance with your instructions, for the construction of a subway from the present Park Street subway station, at the easterly end of the tunnel for the Cambridge connection, to the South Station.

The plans provide for a station east of Washington Street, with connections to the Summer and Winter stations of the Washington Street tunnel. Entrances to and exits from this station can be made either from the sidewalks on each side of the street, with small coverings over the stairways, or from within private property, with stairways similar to those in Franklin Street and in Temple Place, for the Washington Street tunnel. The plans also provide for a station under Atlantic Avenue and the present Elevated Railway station on the westerly side of the South Terminal railway station. Cross-overs from one track to the other, to enable cars to return, may be located in the portion of the subway extending 500 feet south of this station. The approximate location and profile of the route as contemplated by one of these studies is shown on the accompanying plan.

The cost of construction of such a subway, with the two stations before mentioned, including the cost of making such changes in the water pipes and sewers as may be required, and exclusive of land damages, is estimated to be approximately $2,600,000.

Yours truly,

EDMUND S. DAVIS,
Acting Chief Engineer.

APPENDIX B.

AN ACT AUTHORIZING THE CONSTRUCTION OF A TUNNEL FROM BOSTON COMMON TO THE SOUTH STATION.

Be it enacted, etc., as follows:

SECTION 1. The Boston transit commission, hereinafter called the commission, may construct in the city of Boston, hereinafter called the city, a tunnel to be designated as the South station tunnel, and hereinafter called the tunnel, so designed as to be adapted to contain two railway tracks, connecting with the Park street station of the Cambridge connection, so-called, under Boston common, and running under Tremont street, Winter street, Washington street, Summer street, Dewey square and Atlantic avenue south of Dewey square to such point as may be requisite for a station having connections with the South station, and in and under any other public or private ways or lands, together with approaches, sidings, entrances, stations, elevators, inclines, connections and other structures, hereinafter called appurtenances, which shall also include connections with the Tremont street subway, the Washington street tunnel and said South station.

SECTION 2. The commission shall immediately after the passage of this act make such preliminary investigations, surveys and plans as it deems expedient, and to that end may enter upon any lands or

place and maintain marks therein, and may make excavations, borings and do all other acts necessary for such investigations and surveys, and may expend such sums as it deems necessary therefor. The expenses incurred in making such preliminary investigations, surveys and plans, together with the expenses already incurred under the provisions of chapter ninety-four of the resolves of the legislature of nineteen hundred and ten, shall be deemed a part of the cost of the work.

SECTION 3. The commission shall not begin the work of construction until it has filed in the office of the commissioner of public works a plan signed by the commission, showing the proposed route or the location thereof, and the general form and method of construction, the location of proposed tracks, stations and approaches, and the alignment and grade, which plan shall be submitted to the Boston elevated railway company, hereinafter called the company, which term shall be deemed to include its successors and assigns, for its approval; nor until the contract for the use of the tunnel, hereinafter provided for, has been executed. Any such plan so filed may be altered at any time by a new plan signed and filed in like manner.

SECTION 4. The commission may make contracts in the name of the city for the work herein authorized, but all contracts involving two thousand dollars or more in amount shall be in writing and signed by a majority of the commission; and no such contract shall be altered except by an instrument in writing, signed by the contractor and a majority of the commission, and also by the sureties, if any, on the bond given by the contractor for the completion of the original contract. No such contract or alteration of any such contract shall be valid or binding on the city unless executed in the manner aforesaid.

SECTION 5. All work done under this act under or near public streets and places shall be conducted, so far as may be practicable, in such manner as to leave such streets and places, or a reasonable part thereof, open for traffic between the hours of seven in the forenoon and six in the afternoon of each secular day, except public holidays.

SECTION 6. The commission may for the purpose of this act use public ways and lands without compensation therefor, and may take for the city, by purchase or otherwise, lands in fee and easements, estates and rights in land, including the right to go under the surface thereof or through or under buildings or parts of buildings thereon; and such takings in fee or otherwise may be made whether the lands taken or otherwise affected are held under or by title derived under eminent domain or otherwise. A taking under this section of an easement or other estate or right in a given parcel of real estate, whether such parcel consists of unimproved land or of land and buildings, may be confined to a portion or section of such parcel fixed by planes or other surfaces of division, below or above or at the surface of the soil; and in such case no taking need be made of upper or lower portions or sections, except of such easements therein, if any, as the commission may deem necessary. The commission, to make any taking by right of eminent domain, shall cause to be recorded in the registry of deeds for the county of Suffolk a description of the lands, easements, estates or rights to be taken, as certain as is required in a common conveyance of land, with the statement that the same are taken under authority of this act, which description and statement shall be signed by the commission; and the lands, easements, estates or rights therein described shall upon such recording be taken for and shall vest in the city. The commission shall, so far as may be practicable, notify all known owners of such taking, but the validity thereof shall not be affected by want of such notice.

SECTION 7. The commission may sell the buildings and other structures upon any lands taken by it, or may remove the same; and shall sell, if a sale be practicable, or if not shall lease, any lands, or rights or interests in land or other property so taken or purchased for

the purposes of this act, whenever the same shall, in the opinion of the commission, cease to be needed for such purposes. The proceeds of such sales and leases and the fair valuation of any such lands or other property no longer needed for such purposes, but not actually sold, shall be deducted from the cost of the subway for the purposes of ascertaining the rental thereof.

SECTION 8. The commission shall determine and award the damages sustained by any person by reason of property taken or injured by the commission under authority of this act, except public ways or lands, and may agree with any person as to the amount to be paid as damages sustained by him for any property so taken or injured, which damages the city shall be liable to pay. If such person is dissatisfied with such award, or cannot agree with the commission upon his damages, the same may be determined by a jury in the superior court for the county of Suffolk, on petition therefor of such person or of the commission against the city, filed in the clerk's office within one year after such property is so taken or injured; and judgment shall be entered upon the determination of such jury and costs shall be taxed and execution issued in favor of the prevailing party as in civil cases. The members of the commission shall not be personally liable for any such damage.

SECTION 9. The commission may order the temporary removal or relocation of any surface tracks, and the temporary or permanent removal or relocation of any conduits, pipes, wires, poles or other property of any person or corporation which it deems to interfere with the construction or operation of the tunnel, and shall grant new locations for any such structures so removed or relocated. Such orders, to the extent specified therein, shall be deemed a revocation of the right or license to maintain such tracks, conduits, pipes, wires, poles or other property, and the owner of any such structures in public ways or lands shall comply with such orders without expense to the city. If such owner shall fail to comply with the order of the commission within a reasonable time, to be fixed in the order, the commission may discontinue and remove such tracks, conduits, pipes, wires, poles or other property, and may relocate the same, and the cost of such discontinuance, removal or relocation shall be repaid to the city by the owner. No such discontinuance, removal or relocation shall entitle the owner of the property thus affected to any damages on account thereof. Any such structures in or upon private lands may be removed and relocated by the commission, or if removed and relocated by the owner thereof, the reasonable expense shall be repaid to him by the commission. Any gas or electric lighting company may shut off the gas or current from any pipes or wires affected by any acts done hereunder, when and so far as may be necessary to avoid danger of escape or explosion of gas, or other public danger.

SECTION 10. After the acceptance of this act and within three months from the final determination by the commission or by the board of railroad commissioners, hereinafter called the board, on appeal, of all important questions required to be decided before construction begins, the commission shall execute with the company, in the name of the city of Boston, the company consenting thereto, a contract in writing for the sole and exclusive use of the tunnel by the company, for the running of its cars therein and for other purposes, for a term of years from the beginning of the use thereof, at an annual rental equal to per cent. of the net cost thereof, and upon such other provisions and conditions, not affecting the term or rental, and following the form of the lease made by and between the commission and the company for the use of the Washington Street tunnel, so far as the same may be applicable, as the commission and the company may agree upon, or, in case of difference, as the board may determine. The provisions of this act, in so far as they declare, define or establish the terms and conditions for the

construction, tenure, maintenance and operation of the tunnel, shall be embodied in and made part of said contract. The use of the tunnel shall begin when, in the opinion of the commission, a reasonable time after completion has been allowed for equipment. The net cost thereof shall be deemed to include, except as herein otherwise provided, all expenditures incurred in acquisition and construction, including damages, expenses and salaries of the commission, and interest at three and one-fourth per cent. per annum on the debt incurred in construction prior to the beginning of the use.

The company may, for the purpose of this act, including all equipment or other expenditure by the company required or authorized hereby, from time to time, in the manner and subject to the requirements prescribed by law, issue and dispose of such amounts of its capital stock or bonds, at its option, in addition to the amounts hereinbefore authorized, as may be necessary therefor.

With respect to the equipment, use and operation of the railway to be operated in the tunnel, and transportation thereon, the company shall have all the powers and privileges, and be subject to all the duties, liabilities, restrictions and provisions, set forth in general and special laws now or hereafter in force applicable to it, so far as the same do not impair contract rights or privileges acquired under any law or otherwise.

SECTION 11. Upon the determination by the commission of any important question arising in the course of the work herein provided for upon which the company has previously requested a hearing, except an award of or agreement upon damages, as provided in section eight hereof, the company may within three days after notice of such determination apply to the board for a revision of the same, and thereupon the board may consider and finally determine such question.

SECTION 12. The treasurer of the city shall from time to time, on request of the commission, issue and sell at public or private sale the bonds of the city, registered or with interest coupons attached, as he may deem best, to an amount not exceeding the cost of the tunnel herein provided for. Such bonds shall be designated on their face, South Station Tunnel Loan; shall be for such terms, not exceeding fifty years, as the mayor and treasurer of the city may determine; and shall bear interest payable semi-annually, at such rate, not exceeding four per cent. per annum, as the treasurer shall determine. The debts incurred by the city from time to time under the provisions of this act shall not be included in determining the limit of indebtedness of the city as established by law, and the proceeds of such bonds shall be used to meet all damages, costs and expenses incurred by the commission or by the city in carrying out the provisions of this act. The board of commissioners of sinking funds shall establish a sinking fund for the payment of the bonds issued under this act. All premiums received from the sale thereof shall be paid into the sinking fund. All rents, tolls, percentages or other annual compensation received by the city for any use of the tunnel under this act, or for any use of any lands or rights taken under authority of this act, shall annually be used by the treasurer, first, to meet the requirements of any deficiency in the sinking fund; second, to meet the interest on the bonds; and the surplus, if any, as a part of the general revenue of the city. The proceeds from any sale or lease of lands or rights taken by purchase or otherwise under authority of this act shall be paid into the sinking fund, or shall be used for construction, as the commission may determine.

SECTION 13. The supreme judicial court and the superior court, upon application of any party in interest, including the company, the city, or any ten taxable inhabitants thereof, may enforce or prevent violation of the provisions of this act by any appropriate process.

SECTION 14. This act shall take effect upon its acceptance by the company, by vote of its board of directors and return thereof, within two months after its passage.

APPENDIX G.

THE COMMONWEALTH OF MASSACHUSETTS.

To the Senate and House of Representatives.

Chapter 97 of the Resolves of the year 1910 reads as follows:—

RESOLVE TO PROVIDE FOR A REPORT BY THE BOSTON TRANSIT COMMISSION ON CERTAIN PROPOSED IMPROVEMENTS IN TRANSPORTATION IN THE CITY OF BOSTON.

Resolved, That the Boston transit commission is hereby authorized and directed to investigate and report in print to the next general court on or before the second Saturday in January, nineteen hundred and eleven, whether or not in its opinion it is advisable and for the public interest to grant any or all of the following petitions for legislation, namely:—The petition of Charles L. Carr for legislation to provide rapid transit to and through the Dorchester district of the said city, which petition is accompanied by House bill number eight hundred and eleven; the petition of William S. McNary and others for legislation to provide improved transit between that part of the city of Boston known as the city proper and Dorchester and South Boston, the said petition being accompanied by House bill number eight hundred and twelve; and also the petition of William S. McNary and others to provide for rapid transit between the city proper and the South Boston district, the said petition being accompanied by House bill number eight hundred and thirteen. The said commission shall report under what conditions and restrictions, if any, and in what form the said legislation should be granted. The said commission is also directed, after an appropriation sufficient to cover the expense of the same as estimated by it has been made by the city of Boston, to give public hearings, and to investigate and report in print, on or before the date above mentioned, a route for a subway or tunnel to the Dorchester district of the city of Boston, including such connections with the South Boston district as public interest may require, the said subway or tunnel to start at or near the South station, at a point convenient for a junction with the proposed tunnel from Park street, and to run to such point in or near the Dorchester district as will most conveniently provide rapid transit between Boston proper and Dorchester and South Boston. The commission shall embody in its report an estimate of the cost of constructing such subway or tunnel. [*Approved May 13, 1910.*

By chapter 139 of the Resolves of the year 1910 the Board of Railroad Commissioners was added to the Transit Commission, to constitute a Joint Board to consider the matters covered by this resolve.

On July 19, 1910, the city of Boston appropriated the sum of $3,500 to cover the expense of the investigation authorized by this resolve, such sum being the estimated amount of such expense.

In accordance with this resolve the Joint Board has held public hearings, duly advertised, and has made studies, plans and estimates of cost for the subway referred to, and it now submits its report as follows:—

Among the bills referred to the same Joint Board by the General Court of 1909, under chapter 94 of the Resolves of that year, relating to additional subways and other transportation improvements in the metropolitan district, all of which were reported upon to the Legislature of 1910 (printed as Senate Document No. 28 of that year), were two bills (House Bill No. 1030 and House Bill No. 339), providing for the construction of subways to South Boston. The former bill provided for a subway to Marine Park; the latter for a subway from "the junction of Broadway and Washington Street or near by" to the junction of Broadway and Dorchester Avenue. A third bill referred to this Joint Board by the same resolve

(House Bill No. 236) provided for the construction of a subway from the corner of Tremont and Park streets to Milton Lower Mills.

In its report to the Legislature of 1910 upon these bills this Board stated the objections to extending the subway system either to Marine Park, South Boston, or to Milton Lower Mills. It was pointed out that the traffic between the transfer station on Dorchester Avenue and Marine Park was insufficient to justify the construction of a subway having its terminal at the latter point, and the expense of constructing such a subway from a connection with the Tremont Street subway was estimated at $6,000,000 to $8,000,000, exclusive of land damages. It was also pointed out that the cost of the proposed subway to Milton Lower Mills, estimated at over $13,000,000 without land damages, was prohibitory, and that the present population living near the proposed line and to the south of Andrew Square was quite insufficient to support a subway. The Joint Board has not changed these opinions; but in its present report, based upon different petitions and bills, it is able to deal with the far more practicable proposals of affording the people of South Boston and Dorchester a subway which will not extend through Dorchester to the confines of the city, but will afford the people of those districts rapid transit to a terminal at Andrew Square, with transfers to surface cars.

In its reports to the Legislature of 1910 this Board recognized the fact that the first step in the direction of the construction of any of the subways then before it for report should be the extension of the Cambridge tunnel to the South Station. It therefore recommended that further detailed studies be made in relation to such a subway, and suggested the desirability of permissive legislation for its construction. Such studies have been made, and such permissive legislation is now definitely recommended by this Joint Board in another report which it is making to the Legislature under the provisions of chapter 94 of the Resolves of 1910.

The bills referred to this Joint Board by chapter 97 of the Resolves of the year 1910, quoted above, are as follows: House Bill No. 811, "To provide for Rapid Transit to and through the Dorchester District of the City of Boston;" House Bill No. 812, "To provide for the Construction of the Dorchester Subway in the City of Boston;" House Bill No. 813, "To provide for the Construction of the South Boston Subway in the City of Boston."

Studies, counts and observations of traffic, borings, plans and estimates have been made by the acting chief engineer and the engineering staff of the Transit Commission, some of which, together with the report of the acting chief engineer, are submitted as an Appendix to this report.

It may conduce to a clearer understanding of the situation with reference to the proposed subways if brief reference is made to the special report made by the Transit Commission to the Legislature five years ago (Jan. 19, 1906), on the general question of transportation in the metropolitan district.

At that time elevated trains were being run through the Tremont Street subway; the Washington Street tunnel was under construction, but far from completion. Provision had been made by the Legislature for the construction of a so-called "east-side subway" for surface cars, to be located east of the Washington Street tunnel. No provision had then been made for the Riverbank subway, or for the Boston end of the Cambridge subway, although chapter 500 of the Acts of the year 1897 contemplated a subway in and under Cambridge Street, Bowdoin Square and Court Street, to enable surface cars coming in over the Cambridge bridge to reach an underground station in Scollay Square. Nor had any provision been made for the extension of the elevated railway structure over the Craigie bridge, or to Malden. The entire district, therefore, to the west and northwest of Boston, including the Back Bay, Brighton, Brookline and the parts of Boston tributary to Huntington Avenue, together with Cambridge, Waltham, Arlington, etc., were actually dependent for rapid transit upon the tracks of the Tremont Street subway between the entrance in the Public Garden and the Boylston Street station, while the construction of a short subway under Cambridge and Court streets was a possibility of the future.

As a result of its studies at that time, the Transit Commission reported that, with the construction first of the Washington Street tunnel and later of the east side subway, reasonable facilities would be afforded for the traffic from the south, and that the imperative need was for additional transit facilities from the west.

The year after this report was made the Legislature of 1907 rescinded those provisions of the act of the year 1902 which provided for the construction of an east side subway, and substituted therefor the Riverbank subway, to extend westward from Park Street station to a point near the junction of Beacon Street and Commonwealth Avenue. This act provided for the additional facilities for traffic moving east and west which had been urgently recommended by the Transit Commission, but it diminished the authorized transit facilities for traffic moving south and north. Since that time, also, the subway in Cambridge has been finally authorized and is now nearly completed, together with the connection under Beacon Hill bringing it to a new station at Park Street on a lower level.

It appears, therefore, that the Legislature has, since 1906, provided for additional transportation facilities for the population lying to the west of Boston proper, but has curtailed those previously authorized for the population lying to the south.

From the plan of the metropolitan district submitted herewith with the report of Mr. Edmund S. Davis, acting chief engineer of the Transit Commission, the following appears:—

	Sq. Miles.	
The district to the north and northwest, which will be served, among others, by the extension of the Boston Elevated to Malden, has an area of . .	17.92	
With a population of about		164,000
Towards the northeast, tributary to the East Boston tunnel lines, there is an area of about . . .	14.60	
With a population of about		121,000
Towards the west, tributary to the Cambridge subway and the Craigie bridge elevated extension, there is an area of about	19.00	
With a population of about		183,000
Towards the west and southwest, tributary to the Riverbank subway, to the Boylston Street branch of the Tremont Street subway, and also, to a small extent, tributary to the Tremont Street entrance of the latter subway, there is an area of about . .	30.00	
With a population of about		210,000
Towards the south and west, tributary to the Washington Street tunnel and to the elevated extension to Forest Hills, there is an area of about . . .	14.00	
With a population of about		186,000
Towards the south and east there is a region which would naturally be tributary to a new subway or elevated line, embracing nearly	30.00	
With a population of about		190,000

The boundaries of the areas above named are necessarily somewhat arbitrary. In no case is any territory included which lies more than ten miles from the City Hall. It must also be borne in mind that the Tremont Street subway is not, strictly speaking, intended for rapid transit to the suburbs, like the Cambridge connection tunnel under Beacon Hill or the Washington Street tunnel; it is a short subway running only through the heart of the city, and rendered necessary by the congestion in the streets.

The last-named area, lying to the south and east of Boston proper, embracing South Boston and parts of Dorchester within the city limits, and Milton and Quincy beyond them, has now no direct rapid-transit electric lines, whether underground or elevated, leading to the center of

the city. Its inhabitants must depend upon surface cars or upon the steam lines of the New York, New Haven & Hartford Railroad system, which with its various branches, affords steam transportation to the South Station.

In addition to surface cars and steam railroad facilities, however, rapid transit by elevated or subway lines is very desirable, and in that respect this district is clearly at a disadvantage as compared with most of the other outlying districts surrounding Boston proper.

The observations with reference to surface-car transportation to and from this district, the counts of cars and passengers, and the other information, obtained for the purpose of this report, set forth in the report of the acting chief engineer of the Transit Commission, show that the present surface facilities are inadequate, the time occupied in going even short distances entirely too great, and the cars overcrowded; these facts disclose the urgent need of improved facilities.

Many of the inhabitants of that part of the Dorchester district lying nearest to the elevated railway use the Washington Street tunnel trains to Dudley Street and surface cars beyond, in spite of the fact that this route to their homes is longer than that of the surface cars running through South Boston. Both the tunnel trains and the surface cars are much overcrowded in the rush hours, and there is urgent need for relief.

The population of the Dorchester district is rapidly increasing, probably as rapidly as that of any of the suburban districts.

The entire district which would be tributary to the proposed subway, containing, at the present time, as above stated, a population of about 196,000, is without tunnel, subway or elevated rapid-transit facilities and is estimated to have a population in 1930 of 297,000. With the growth of the district the present traffic conditions will rapidly grow worse, unless some relief is afforded.

As a result of its investigations with reference to this matter, the Joint Board has reached the conclusion that the reasonable demands of the public require the extension of the Cambridge tunnel under Fort Point Channel and Dorchester Avenue to the neighborhood of Andrew Square. If convenient means are there afforded for transfer to surface cars, the Joint Board believes that reasonable facilities will be afforded for the present for transportation to and from the Dorchester district, and that substantial relief from the present overcrowded condition of cars and congestion of streets, with consequent loss of time, will be afforded.

It appears, further, that such a subway will not only be consistent with, but will be required for, a harmonious development of a comprehensive transportation system for the metropolitan district. This system, as now built or provided for, consists of lines radiating in all directions into the suburbs. To the northeast is the East Boston tunnel; to the north, the elevated line to Sullivan Square and Malden; to the northwest, the Craigie bridge elevated line; still farther to the west, the Cambridge tunnel; to the west and southwest, the projected Riverbank subway and the Boylston Street branch of the Tremont Street subway; to the south, the Tremont Street subway and the Washington Street tunnel, with the elevated extension to Forest Hills. A gap in this system of radiating lines would be filled by the construction of a rapid-transit line from the South Station towards the south and southeast, as herein recommended. If such a line is built, the trains or cars from Cambridge, instead of reversing at Park Street or at the South Station, could continue to the proposed southerly terminus near Andrew Square and start from that point on their return trip to Cambridge.

The estimated cost of such a subway, from a point five hundred feet south of the proposed subway station in Atlantic Avenue, near the South Terminal, running under Fort Point Channel and Dorchester Avenue, with a station at the junction of Broadway and Dorchester Avenue and a sub-surface terminal near Andrew Square, is $3,500,000. The proposed extension of the Cambridge tunnel to the South Station contemplates a station in Atlantic Avenue, with the tracks extended about five hundred feet south of such station, to enable trains to cross over to the other track before

reversing their direction. The estimate for the extension to Andrew Square is therefore made from a point at the end of the contemplated tracks in Atlantic Avenue.

The Joint Board is requested by the resolve to report "under what conditions and restrictions, if any, and in what form the said legislation shall be granted." The provisions of the draft bill accompanying the report of this Joint Board under Resolves of 1910, chapter 94, may be referred to as containing the necessary conditions and restrictions, and that draft bill, with appropriate modification as to terminals, route and title of loan, may be used as a form for the legislation herein recommended.

The above report is unanimously submitted.

GEORGE G. CROCKER, *Chairman,*
GEORGE F. SWAIN, *Secretary,*
HORACE G. ALLEN,
JOSIAH QUINCY,
JAMES B. NOYES,
Boston Transit Commission.

WALTER PERLEY HALL,
GEORGE W. BISHOP,
CLINTON WHITE,
Board of Railroad Commissioners.

JAN. 4, 1911.

APPENDIX.

PROPOSED SUBWAY TO SOUTH BOSTON AND DORCHESTER.

BOSTON TRANSIT COMMISSION,
15 BEACON STREET, BOSTON, DEC. 12, 1910.

To the Joint Commission constituted by the Resolves of 1910, chapters 97 and 139.

Gentlemen:—With reference to chapter 97 of the Resolves of the Massachusetts Legislature, session of 1910, in regard to improved methods of transit between the city proper and South Boston and Dorchester, I beg leave to report that preliminary studies and estimates have been made, in compliance with your instructions, for a subway or tunnel from a point in Atlantic Avenue, near the South Station, at the southerly end of the proposed subway or tunnel from Park Street to the South Station, and thence running southerly under Atlantic Avenue, railroad property, Fort Point Channel and other property to Dorchester Avenue near Broadway or Dover Street, thence southerly under Dorchester Avenue to Andrew Square, with stations in South Boston near Broadway or Dover Street and at Andrew Square.

Connection can be made at Andrew Square with cars coming through Dorchester Street from South Boston, and also with cars coming through Dorchester Avenue and Boston Street from Dorchester and the district beyond.

Tables and diagrams giving the results of observations of the number of passengers carried by the street cars, the running time of the cars and studies of the growth of the population of the metropolitan district are given in this report.

RUSH HOURS.

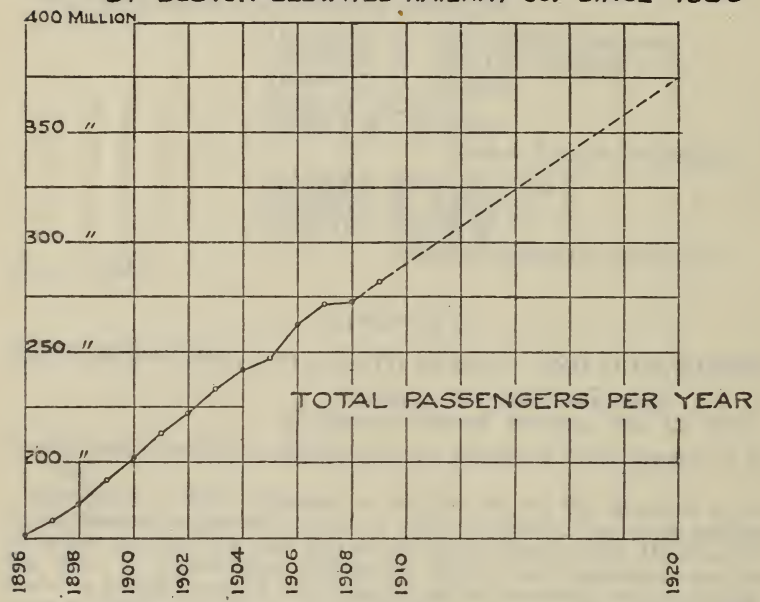
The number of passengers is several times greater during the morning and evening hours than during other hours of the day. The traffic is greatest during the evening hours, the maximum hour in South Boston being from 5.20 P.M. to 6.20 P.M., or thereabouts. As the traffic rate during this hour may determine the capacity of a proposed subway, the observations of the traffic to South Boston and Dorchester have been largely confined to the evening hours.

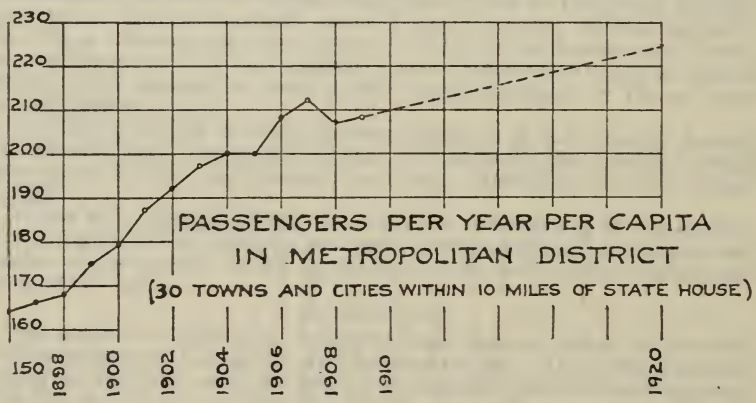
TOTAL NUMBER OF RIDES PER YEAR AND PER CAPITA PER YEAR.

The total number of passengers per year carried by the Boston Elevated Railway Company continues to increase in a fairly uniform manner, the

A

GROWTH OF NUMBER OF PASSENGERS CARRIED BY BOSTON ELEVATED RAILWAY CO. SINCE 1896





total for 1909 being a little over 281,000,000. Partly owing, perhaps, to the use of the automobile, the increase in the average annual number of rides per inhabitant has been halted. Since 1907 it remains at about 209, the figure for 1909 being 208. (See Diagram A.)

AREA TRIBUTARY TO THE PROPOSED SUBWAY.

The area which it is assumed would be served by this proposed subway lies between the Midland Division of the New York, New Haven & Hartford Railroad and the sea. This area comprises the whole of South Boston, a large part of Dorchester, the city of Quincy and the town of Milton. It has a total inhabitable area of 31.56 square miles, and a present population of about 196,400, of which 155,800 reside in the Boston portion of the district reached by 5-cent fares (an area of 8.32 square miles). The western limit of this area is somewhat a matter of conjecture, as it is uncertain which car would be taken by the people living near the boundary. If the Blue Hill Avenue cars should run to the proposed subway, an additional area of 2.3 square miles, lying southeast of Franklin Park, having a population of about 47,000, would be included in the district assumed. It therefore seems that for the purpose of comparison the area adopted is conservative.

OBSERVATIONS OF AMOUNT OF TRAVEL.

The number of pedestrians to South Boston during the evening rush hours is shown by the following tables:—

Count of Out-bound Pedestrians over Bridges to South Boston, Oct. 5, 1910.

TIME (P.M.).	DORCHESTER AVENUE.		SUMMER STREET EXTENSION.		ATLANTIC AVENUE. EXTENSION.		DOVER STREET BRIDGE.		BROADWAY EXTENSION.	
	Ten Minutes.	One Hour.	Ten Minutes.	One Hour.	Ten Minutes.	One Hour.	Ten Minutes.	One Hour.	Ten Minutes.	One Hour.
4.00–4.10, .	9	–	50	–	17	–	20	–	28	–
4.10–4.20, .	17	–	60	–	15	–	47	–	18	–
4.20–4.30, .	15	–	50	–	10	–	54	–	40	–
4.30–4.40, .	10	–	40	–	15	–	38	–	41	–
4.40–4.50, .	9	–	40	–	14	–	49	–	57	–
4.50–5.00. .	10	70	20	260	38	109	36	244	86	270
5.00–5.10, .	6	67	70	280	58	150	163	387	91	333
5.10–5.20, .	28	78	60	280	120	145	254	594	105	420
5.20–5.30, .	15	78	80	310	170	415	122	662	94	474
5.30–5.40, .	29	97	100	370	180	580	130	754	110	543
5.40–5.50, .	76	164	110	440	330	896	154	859	89	675
5.50–6.00, .	63	217	110	530*	390	1,248	208	1,031*	231	820
6.00–6.10, .	48	259	37	497	238	1,428	130	998	227	956*
6.10–6.20, .	53	284*	31	468	171	1,479*	66	813	100	951
6.20–6.30, .	15	284	8	396	60	1,369	80	768	70	927
6.30–6.40, .	12	267	11	307	40	1,229	19	657	40	857
6.40–6.50, .	8	189	10	207	34	933	34	537	41	709
6.50–7.00, .	3	139	13	110	14	557	23	352	16	494

NOTE.— The asterisk indicates maximum hour.

Count of Pedestrians to South Boston, Oct. 5, 1910, P.M., *Weather Fine.*

	4.00 to 4.30 P.M.	4.30 to 5.00 P.M.	5.00 to 5.30 P.M.	5.30 to 6.00 P.M.	6.00 to 6.30 P.M.	6.30 to 7.00 P.M.	Total.	Maximum Hour.
Over Summer Street extension bridge.	160	100	210	320	76	34	900	530
Over Dorchester Avenue extension bridge.	41	29	49	168	116	23	426	284
Over Atlantic Avenue extension bridge.	42	67	348	900	469	88	1,914	1,479
Over Broadway extension bridge.	86	184	290	530	397	97	1,584	956
Over Dover Street extension bridge.	121	123	539	492	276	76	1,627	1,031
Total, ...	450	503	1,436	2,410	1,334	318	6,451	4,282

About 6,500 people walk to their homes on pleasant evenings, the travel amounting, as observed, to over 4,000 during the hour between 5.10 and 6.10 P.M. This travel varies, and is small on very stormy days, when the overcrowding of the cars is proportionately increased.

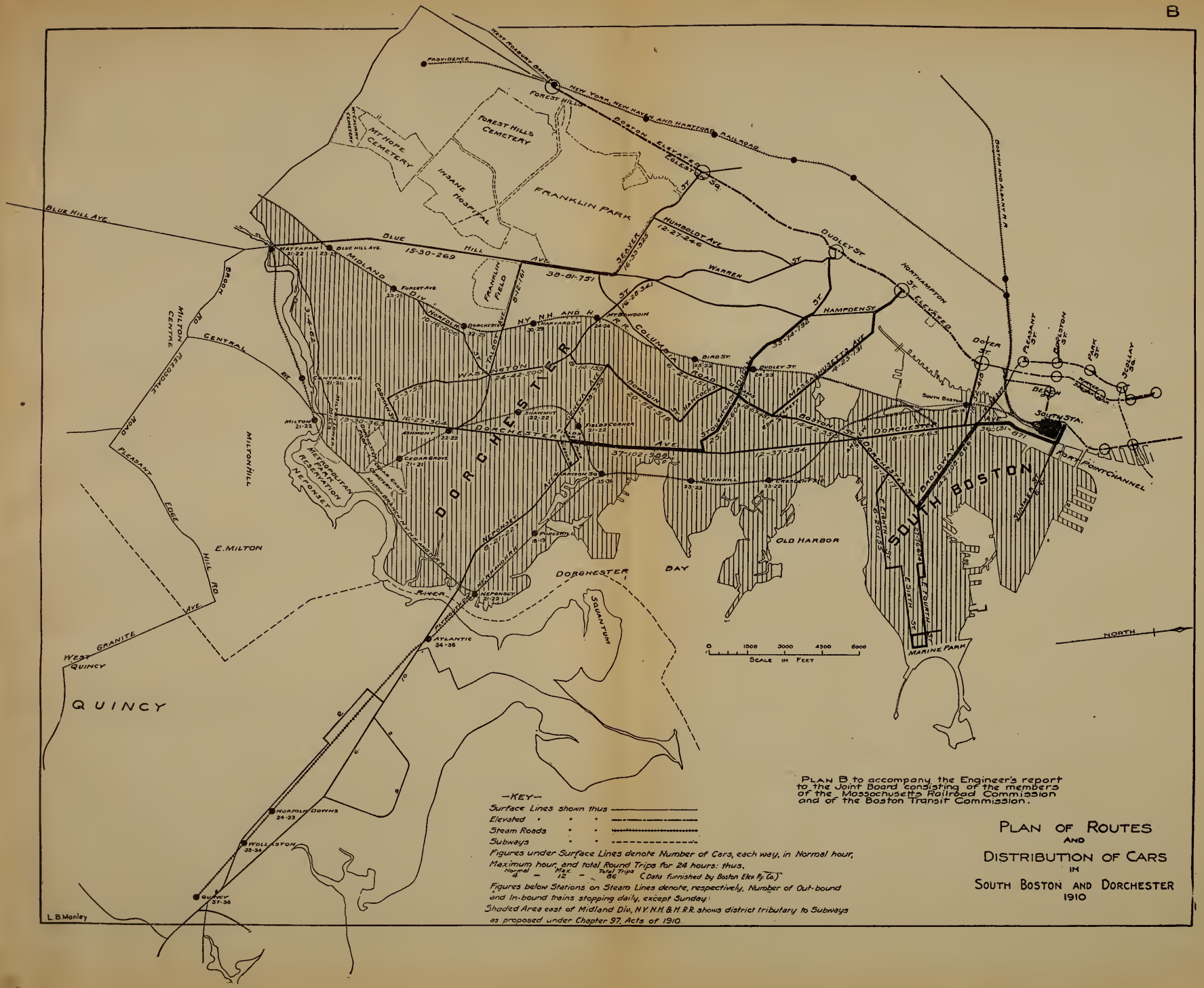
TRAVEL BY CARS.

Passengers on street cars enter the district by several routes, the most important of them being by way of Dorchester Avenue, Dover Street and Broadway extension bridges to South Boston, and by way of Massachusetts Avenue, Dudley Street and Washington Street (Dorchester) to Dorchester. The accompanying plan (Plan B) shows the surface lines throughout the district, on which are indicated the number of cars per hour each way for the normal and rush hours and the total trips per day, as given by the Boston Elevated Railway Company's schedule. This information is also shown by the tables following:—

Daily Car Service from Dorchester to Boston's Business Section, in Normal and Maximum Hours, and Total per Day by Lines. (Furnished by the Boston Elevated Railway Company.)

DORCHESTER CAR SERVICE, SEPT. 23, 1910.

Route No.		Cars per Hour (One Way). Normal Hours.	Cars per Hour (One Way). Maximum, P.M.	Total Trips per Day.
	Dorchester Avenue, via South Boston.			
309	Milton–North Station, via Dorchester Avenue and Federal Street.	6	9	99
311	Park Street Station, via Dorchester Avenue and Federal Street.	–	6	19
322	Neponset–Franklin Street, via Dorchester Avenue and Federal Street.	–	4	20
343	Park Street, via Dorchester Avenue and Federal Street.	6	18	146
	Totals, ...	12	37	284
	Dorchester Avenue, Stoughton Street, Dudley Street.			
302	Milton–Franklin Street, via Dorchester Avenue and Southampton Street.	4	12	84
303	Park Street, via Dorchester Avenue and Southampton Street.	–	6	23
	Carried forward, ...	4	18	107



—KEY—

Surface Lines shown thus ————————

Elevated " " " —·—·—·—·—

Steam Roads " " ++++++++++++

Subways " " - - - - - - - - - - -

Figures under Surface Lines denote Number of Cars, each way, in Normal hour, Maximum hour, and total Round Trips for 24 hours: thus, Normal 4 — Max. 12 — Total Trips 86 (Data furnished by Boston Elev. Ry. Co.)

Figures below Stations on Steam Lines denote, respectively, Number of Out-bound and In-bound trains stopping daily, except Sunday.

Shaded Area east of Midland Div, N.Y. N.H. & H.R.R. shows district tributary to Subways as proposed under Chapter 97, Acts of 1910

Plan B to accompany the Engineer's report to the Joint Board consisting of the members of the Massachusetts Railroad Commission and of the Boston Transit Commission.

Plan of Routes and Distribution of Cars in South Boston and Dorchester 1910

L. B. Manley

Daily Car Service from Dorchester, etc.— Con.

DORCHESTER CAR SERVICE, SEPT. 23, 1910 — Con.

Route No.		Cars per Hour (One Way). Normal Hours.	Cars per Hour (One Way). Maximum, P.M.	Total Trips per Day.
	Dorchester Ave., Stoughton St., Dudley St.— Con.			
	Brought forward, ...	4	18	107
312	Milton–Park Street, subway via Dorchester Avenue and Dudley Street.	6	6	121
316	Milton–Adams Square, via Hampden Street (night car).	–	–	
335	Neponset–North Station, via Dorchester Avenue and Dudley Street.	4	4	84
339	Park Street–Harvard Square, via Dudley and Hampden streets.	3	6	65
344	Adams Square–Dudley Street L, via Stoughton and Dudley streets.	4	12	86
354	Park Street–Copley Square, via Stoughton and Dudley streets.	–	6	18
317	Neponset–Dudley Street L, via Stoughton and Dudley streets.	4	13	123
	Totals, ...	25	65	609
	Meeting House Hill.			
313	Park Street–Franklin Street, via Geneva Avenue and Southampton Street.	–	7	24
340	Park Street–Post Office Square, via Geneva Avenue and Columbia Road.	–	6	28
342	Park Street–Dudley Street L, via Geneva Avenue, .	4	13	136
47	Ashmont Street–Franklin Street, via Washington and Bowdoin Streets.	4	10	87
94	Norfolk Street–Dudley Street L, via Washington and Bowdoin streets.	4	4	72
	Totals, ...	12	40	347
	Columbia Road and Upham's Corner.			
11	Mattapan, Franklin Field and Park to Post Office Square.	.....	.....	.....
41	North Station and Franklin Street, via Columbia Road.	6	24	151
	Washington Street, Dorchester Centre.			
326	Milton–Dudley Street L, via Codman and Washington streets.	3	3	59
7	Ashmont Street L, via Washington and Warren streets.	3	9	79
8	Norfolk Street L, via Washington and Warren streets,	6	12	134
83	Ashmont Street–Park Street subway, via Washington and Warren streets.	4	4	69
	Totals, ...	16	28	341
	Talbot Avenue, Blue Hill Avenue, Humboldt Avenue.			
86	Peabody Square–Dudley Street L, via Talbot Avenue,	4	6	82
97	Peabody Square–North Station, via Talbot Avenue and Seaver Street.	4	6	79
19	Franklin Field–Dudley Street L, via Humboldt Avenue.	12	27	246
52	Mattapan–Dudley Street L, via Blue Hill Avenue and Warren Street.	12	18	193
	Totals, ...	32	57	600
	Carried forward, ...	103	251	2,332

Daily Car Service from Dorchester, etc.— Con.

DORCHESTER CAR SERVICE, SEPT. 23, 1910 — Con.

Route No.		Cars per Hour (One Way). Normal Hours.	Cars per Hour (One Way). Maximum, P.M.	Total Trips per Day.
	Brought forward,	103	251	2,332
	River Street.			
329	Milton to Forest Hills L, via River and Ashland streets.	3	4	62
	Total Dorchester car service,	106	255	2,394

SOUTH BOSTON CAR SERVICE, SEPT. 22, 1910.

	Via Broadway Extension Bridge.			
507–509	City Point to Summer and Washington streets,	–	12	32
525	City Point to North Station,	6	6	118
526	Dorchester Street to North Station,	6	6	57
	Totals,	12	24	207
	Via Dover Street Bridge.			
501	City Point to Harvard Square, via Park Square,	4	10	111
531	City Point to Kendall Square, Cambridge,	–	8	22
502	City Point to Park Square,	–	6	6
505–506	Dorchester Street and City Point to Massachusetts Avenue and Boylston Street.	6	12	106
532	City Point to Dudley Street Station,	4	8	86
535	City Point to Roxbury Crossing,	4	8	87
	Totals,	18	52	418
	Via Dorchester Avenue.			
503	City Point to Post Office Square,	–	10	17
520	City Point to North Station,	6	6	79
523	City Point to Adams Square, via Washington and Summer streets.	–	4	13
545	Dorchester Street–East Boston Ferry, via Atlantic Avenue.	6	12	112
527	City Point to Franklin Street, via Bay View,	–	8	22
529	City Point–Harvard Square, via Bay View and East Cambridge.	6	12	133
	Totals,	18	52	376
	Via Dorchester Street.			
511–517	Dorchester Street, corner Broadway, to Park Street station.	–	–	–
	Dorchester, via Meeting House Hill,	8	12	171
	Total daily South Boston car service,	56	140	1,172

It will be noticed that the number of cars per maximum hour is very large on some routes, particularly on Dorchester Avenue, at Broadway, with a total of 131 per hour; between Savin Hill and Fields Corner, with a maximum of 102 per hour; and in Broadway, between Dorchester Avenue and Dorchester Street, with a maximum of 108 per hour. The first and last named figures, however, could be diminished if the Summer Street line should be extended across the L Street bridge to East Fourth Street, and some of the cars diverted to the Summer Street route which now run through Broadway.

COUNTS OF PASSENGERS.

A count of the out-bound passengers entering the district on surface cars during the fine evenings of Sept. 28 and Oct. 3, 1910, showed a total of about 14,000 per maximum hour, with a total of over 27,000 people during the time between 3.30 P. M. and 7 P. M. Of these, 5,200 entered by way of Dorchester Avenue in 113 cars, from 5.20 to 6.20 P. M., or an average of 46½ persons per car. The counts are shown by the following tables:—

Out-bound Passengers on Boston Elevated Railway Company's Cars entering the Proposed South Boston and Dorchester Subway Districts during Maximum Evening Hour, by Counts of Sept. 28, and Oct. 3, 1910, Weather Fine.

	Observed at —	Number.	
To South Boston.			
Via Dorchester Avenue,	Corner Broadway,	5,200*	
Via Dover Street,	Bridge,	3,570	
Via Dorchester Street,	Andrew Square,	170	
		8,940	
Deduct through passengers on Dorchester cars.	– – –	3,070	
Net passengers to South Boston,	– – –		5,870
To Dorchester.			
Via Dorchester Avenue and Boston Street,	Andrew Square,	3,900	
Via Massachusetts Avenue,	Edward Everett Square,	1,340	
Via Dudley Street,	Upham's Corner,	2,160	
Via Washington Street, Dorchester,	Columbia Road,	1,500	
Via Talbot Avenue,	New York, New Haven & Hartford Railroad.	170	
Via River Street,	Mattapan Square,	60	
Total to Dorchester,	– – –		9,130
Total to South Boston and Dorchester....	– – –		15,000
Deduct 830 passengers taking cars in South Boston for Dorchester, and 170 taking cars in Dorchester for South Boston.	– – –		1,000
Net number of persons entering district in maximum hour.	– – –		14,000

* A count at this locality on Oct. 7, 1910, between 5.30 and 6.20 P.M., in a light drizzling rain, gave 6,180 passengers per hour.

Passengers on Boston Elevated Railway Company Cars entering the Proposed South Boston and Dorchester Subway Districts during Evening Rush Hours, estimated from Counts made Sept. 28 and Oct. 3, 1910, Weather Fine.

	3.30 to 4.00 P.M.	4.00 to 4.30 P.M.	4.30 to 5.00 P.M.	5.00 to 5.30 P.M.	5.30 to 6.00 P.M.	6.00 to 6.30 P.M.	6.30 to 7.00 P.M.	Total.	Maximum Hour.
Via Dorchester Avenue bridge	501	531	776	1,569	2,763	2,175	850	9,165	5,200
Via Dover Street bridge *	417	531	755	1,156	1,639	1,804	725	7,027	3,570
Via Massachusetts Avenue & Edward Everett Square.	86	142	166	413	606	688	273	2,374	1,340
Via Dudley Street and Upham's Corner.	429	394	720	755	1,159	904	716	5,077	2,160
Via Washington Street, Dorchester.	170	261	381	510	509	770	593	3,194	1,500
Via Talbot Avenue, .	47	37	50	35	84	65	74	392	170
Totals, . .	1,650	1,896	2,848	4,438	6,760	6,306	3,231	27,229	.....

* Broadway extension bridge closed, to cars, for repairs.

On Oct. 7, 1910, in a light, drizzling rain, the estimated total number of passengers entering South Boston by way of Dorchester Avenue was 6,100, in 109 cars; and a count on November 4, in a pouring rain, during the same hour, gave a total of 5,970, in 88 cars,— an average of 68 passengers per car. The seating capacity of these cars averages 33. These counts are approximate only, it being extremely difficult to accurately count passengers in a car holding over 70. One car of which a careful count was made held 94 passengers 14 being on each platform and 32 standing inside. This is about the extreme limit of capacity for a closed car of this size. The following table gives the count in detail:—

Counts of Passengers carried by Surface Cars of Boston Elevated Railway Company, Outbound Cars to South Boston and Dorchester, observed at Corner of Dorchester Avenue and Broadway.

Time (P.M.).	Sept. 28, 1910, Fair Weather.				Oct. 7, 1910, Light, Drizzling Rain.				Nov. 4, 1910, Raining Hard.			
	To South Boston.		To Dorchester.		To South Boston.		To Dorchester.		To South Boston.		To Dorchester.	
	Passengers.	Total.	Passengers.	Total.	Passengers.	Total.	Passengers.	Total.	Passengers.	Total.	Passengers.	Total.
5.20 to 5.30	48		77		59		51		68		84	
	28		72		66		80		72		67	
	18		28		40		75		–		82	
	53		54		53		69		–		65	
	48		35		–		52		–		–	
	43		28		–		50		–		–	
	50		53		–		34		–		–	
	32		69		–		6		–		–	
	38		45		–		–		–		–	
	–		46		–		–		–		–	
		358		507		218		417		140		298
5.30 to 5.40	48		20		59		64		80		72	
	40		55		52		40		80		80	
	35		40		51		74		58		70	
	38		20		45		62		74		34	
	29		25		59		70		70		50	
	33		60		52		26		50		36	
	40		29		40		13		–		38	
	48		49		45		58		–		40	
	40		65		–		76		–		–	
	–		20		–		–		–		–	
	–		52		–		–		–		–	
	–		39		–		–		–		–	
	–		52		–		–		–		–	
	–		37		–		–		–		–	
		351		563		403		483		412		420

Counts of Passengers, etc.— Concluded.

Time (P.M.).	Sept. 28, 1910, Fair Weather.				Oct. 7, 1910, Light, Drizzling Rain.				Nov. 4, 1910, Raining Hard.			
	To South Boston.		To Dorchester.		To South Boston.		To Dorchester.		To South Boston.		To Dorchester.	
	Passengers.	Total.	Passengers.	Total.	Passengers.	Total.	Passengers.	Total.	Passengers.	Total.	Passengers.	Total.
5.40 to 5.50	45		46		54		75		56		58	
	37		32		40		75		60		68	
	39		73		51		75		65		85	
	41		77		75		70		50		74	
	38		52		50		75		70		70	
	38		37		75		60		78		73	
	51		67		80		62		74		89	
	42		35		–		51		79		80	
	58		57		–		31		80		66	
	38		55		–		42		–		–	
	–		32		–		56		–		–	
	–		50		–		66		–		–	
	–		–		–		76		–		–	
		427		613		425		814		612		663
5.50 to 6.00	35		69		58		74		80		85	
	46		66		64		72		85		36	
	46		74		64		73		83		57	
	58		50		42		50		85		65	
	55		57		81		71		95		80	
	49		55		84		50		87		70	
	32		50		75		57		–		65	
	32		35		75		55		–		65	
	–		–		–		94		–		–	
	–		–		–		57		–		–	
	–		–		–		60		–		–	
		353		456		543		713		515		523

6.00 to 6.10	45		28		40		80		75		90	
	24		12		60		44		80		85	
	50		58		75		20		90		65	
	55		55		75		60		85		60	
	41		57		54		54		75		68	
	15		40		80		60		80		60	
	60		54		60		62		85		80	
	–		41		60		72		83		–	
	–		45		54		74		87		–	
	–		48		–		38		–		–	
	–		58		–		36		–		–	
	–		53		–		40		–		–	
	–		54		–		–		–		–	
		290		603		558		640		740		508
6.10 to 6.20	45		62		47		53		79		34	
	17		84		56		70		54		90	
	25		62		78		68		85		28	
	24		44		55		55		80		76	
	32		59		25		68		66		42	
	20		36		50		20		80		60	
	52		75		30		75		80		40	
	38		–		35		70		–		44	
	50		–		45		–		–		36	
	48		–		16		–		–		16	
	–		–		16		–		–		30	
	–		–		32		–		–		34	
	–		–		–		–		–		85	
		351		422		485		479		524		615
	Cars.	Passengers.	Cars.	Passengers.	Cars.	Passengers.	Cars.	Passengers.	Cars.	Passengers.	Cars.	Passengers.
Totals	43	2,130	64	3,164	48	2,632	61	3,546	39	2,943	49	3,022
Total number of cars	–	–	107 *	–	–	–	109 †	–	–	–	88 †	–
Total number of passengers	–	–	–	5,294	–	–	–	6,178	–	–	–	5,570
Average per car	–	–	–	49.5	–	–	–	56.6	–	–	–	68
Per cent. standing	–	–	–	20	–	–	–	42	–	–	–	50

* Mostly open cars, seating from 40 to 60 passengers.

† Closed cars, seating an average of 33 passengers.

TIME OF TRAVEL.

The following tables give the scheduled running times of cars from the vicinity of the Boston Post Office to various points in Dorchester and South Boston, as furnished by the Boston Elevated Railway Company, and also the observed running time to some of these points during the rush hours. The table also shows the running time of steam trains from the South Terminal to stations within the district in consideration.

Running Time of Cars to South Boston and Dorchester.

Distance from Franklin Street (Feet).	SURFACE CARS TO —	7.30 A.M. TO 6.00 P.M.					
		FROM POST OFFICE SQUARE.		FROM FRANKLIN STREET.		FROM DUDLEY STREET.	
		Schedule Minutes.	Observed Minutes.	Schedule Minutes.	Observed Minutes.	Schedule Minutes.	Observed Minutes.
2,625	South Station, . . .	3	4.5	4	9	–	–
6,750	Corner Broadway and Dorchester Avenue, via Dorchester Avenue.	8	9.7	–	14	–	–
	Corner Broadway and Dorter Avenue, via Broadway extension.	–	–	9	–	–	–
	Corner Dorchester Street and Broadway.	13	14.5	14	–	–	–
	Flood Square, . . .	14	17	15	–	–	–
	City Point, via Broadway,	22	22	23	–	–	–
	City Point, via Bay View,	27	–	–	–	–	–
11,625	Andrew Square, . .	13	17	14	21	–	–
	Corner Northampton and Washington streets.	–	–	15	18	–	–
	Edward Everett Square, via Washington Street.	–	–	21	28	–	–
	Edward Everett Square, via Boston Street.	17	21	18	25	–	–
	Upham's Corner, . .	19	24	20	28	–	–
	Upham's Corner, via Dudley Street.	–	–	–	–	8.5	12
	Upham's Corner, via Northampton Street.	–	–	23	31	–	–
17,450	Corner Savin Hill Avenue and Dorchester Avenue, via Stoughton Street.	–	–	23	–	11.5	15.5
	Corner Savin Hill Avenue and Dorchester Avenue, via Dorchester Avenue.	19	24.5	20	29	–	–
	Eaton Square, via Boston Street.	22	–	23	–	–	–
22,500	Park Street, via Hancock Street.	29	–	30	–	18.5	–
	Park Street, via Stoughton Street.	–	–	32	–	17.5	23.5
	Park Street, via Dorchester Avenue.	25	32	26	37	–	–
	Park Street, via Hampden Street.	–	–	34	41	–	–

Running Time of Cars to South Boston and Dorchester.— Con.

Distance from Franklin Street (Feet).	SURFACE CARS TO —	7.30 A. M. TO 6.00 P.M.					
		FROM POST OFFICE SQUARE.		FROM FRANKLIN STREET.		FROM DUDLEY STREET.	
		Schedule Minutes.	Observed Minutes.	Schedule Minutes.	Observed Minutes.	Schedule Minutes.	Observed Minutes.
22,500	Park Street, via Northampton Street.	–	–	33	44	–	–
	Neponset, via Hampden Street.	–	–	42	49	–	–
	Neponset, via Dorchester Avenue.	–	–	34	–	–	–
	Neponset, via Dudley Street.	–	–	–	–	26.5	–
32,100	Milton, via Dorchester Avenue.	34	45	35	50	–	36.5
	Milton, via Washington Street, Dorchester.	–	–	–	–	–	–
	Milton, via Northampton and Stoughton streets.	–	–	42	57	–	–
	End of Adams Street line,	–	–	–	–	25.5	–
	Grove Hall, via Blue Hill Avenue.	–	–	–	–	10	–
	Grove Hall, via Warren Street.	–	–	–	–	10	–
	Franklin Park, via Grove Hall.	–	–	–	–	13	–
	Franklin Park, via Upham's Corner.	27	–	28	32.5	–	–
	Franklin Field, via Upham's Corner.	30	–	31	36	–	–
	Franklin Field, via Grove Hall.	–	–	–	–	16	–
	Mattapan, via Grove Hall,	–	–	–	–	24	–
	Mattapan, via Upham's Corner.	38	–	39	44	–	–
	End of Norfolk Street line, via Washington Street.	–	–	–	–	22.5	–
	End of Norfolk Street line, via Upham's Corner.	–	–	–	–	24.5	–
	End of Talbot Avenue line,	–	–	–	–	23	–
48,487	Quincy Square, via Dorchester Avenue.	–	61	–	66	16.5	53
	From Forest Hills Elevated Station.						
	To Ashland Street, . .	5	9	–	–	–	–
	To Mattapan Square, .	19	20	–	–	–	–
	To Milton, . . .	27	28	–	–	–	–
	To Charles River bridge, West Roxbury.	21	–	–	–	–	–

NOTE.— Observed times noted are during the rush hours.

Running Time of Elevated Cars.

From North Station to —	Minutes.	Seconds.	From North Station to —	Minutes.	Seconds.
Union,	1	27	Egleston Square,	16	30
Milk,	2	52	Forest Hills,	20	—
Winter,	4	—	Battery Street,	2	09
Boylston,	5	19	State Street,	3	47
Dover Street,	7	42	Rowe's Wharf,	4	53
Northampton Street,	9	54	South Station,	6	37
Dudley Street,	12	—	Beach Street,	8	07
			Dover Street,	10	35

Running Time of Steam Trains.

From South Station to —	Minutes.	From South Station to —	Minutes.
Crescent Avenue,	8	Ashmont,	18
Savin Hill,	10	Cedar Grove,	20
Harrison Square,	13	Milton,	23
Pope's Hill,	15	Dudley Street,	7
Neponset,	17	Bird Street,	9
Atlantic,	20	Mt. Bowdoin,	12
Norfolk Downs,	22	Harvard Street,	14
Wollaston,	24	Dorchester,	16
Quincy,	28	Forest Avenue,	18
Fields Corner,	14	Blue Hill Avenue,	21
Shawmut,	16	Central Avenue,	25
		Mattapan,	27

CONGESTION OF STREETS BY SURFACE CARS.

Much delay occurs on account of the congestion of surface cars in the middle of the city. Between 5 and 6 P.M. it takes an average of 9 minutes to ride from the corner of Hawley and Franklin streets through Hawley Street and down Summer Street to the South Station, a distance which may be walked in 6 minutes. Some cars at about 5.30 take 12 minutes to traverse this route.

The corner of Summer and Washington streets is a very congested locality at night. By count, 155 south-bound and 153 north-bound cars passed through Washington Street, south of Summer Street, on November 2 between 5.10 and 6.10 P.M. In such a narrow street the passing of so many cars seriously impedes the progress of any other vehicle. Of the 155 south-bound cars noted, about half were bound for the Dorchester and South Boston subway district; a considerable number of the other half were "Blue Hill Avenue" cars.

There is a marked congestion at Dorchester Avenue and Broadway in South Boston during the early evening hours, caused by the surface cars and the large number of other vehicles which are of necessity passing through the streets. By count of November 8, 304 vehicles, other than street cars, mostly heavy teams, passed through Dorchester Avenue at this point between 5.20 and 6.20 P.M., as shown by the following table:—

Count of Teams passing Corner of Dorchester Avenue and Broadway, South Boston, observed Nov. 8, 1910.

TIME.	Outbound (to South Boston).		Inbound (to Boston).	
P. M.				
5.10–5.20,	32		10	
5.20–5.30,	52	252 per hour.	11	52 per hour. Total, 304 per maximum hour, 5.20 to 6.20 P.M.
5.30–5.40,	56		6	
5.40–5.50,	43		7	
5.50–6.00,	37		8	
6.00–6.10,	30		9	
6.10–6.20,	34		11	
6.20–6.30,	17		5	
A. M.				
6.50–7.00,	2		19	
7.00–7.10,	3	52 per hour.	23	189 per hour. Total, 241 per maximum hour, 7 to 8 A.M.
7.10–7.20,	9		44	
7.20–7.30,	6		28	
7.30–7.40,	10		30	
7.40–7.50,	9		38	
7.50–8.00,	15		26	
8.00–8.10,	9		16	
8.10–8.20,	12		18	
8.20–8.30,	8		24	
8.30–8.40,	12		14	
8.40–8.50,	7		19	
8.50–9.00,	14		16	

WASHINGTON STREET TUNNEL SERVICE.

The capacity of the Washington Street tunnel and elevated route to Dudley Street has a direct bearing on the subject, because so many persons living in the Dorchester subway district reach their homes by this route. If its capacity were equal to all demands, proper connection at Dudley Street and other stations would take care of much of the Dorchester travel, leaving out of consideration the congestion of the streets by surface cars. It, however, does not appear that it has such a capacity.

Trains of six cars are now running through the tunnel on $2\frac{1}{2}$ minute headway during the rush hours, and are excessively crowded between the hours of 5 and 6 P.M. Counts of passengers on Forest Hills cars at various times have given the following results:—

	Leaving Boylston Street.	Leaving Northampton Street.	Leaving Dudley Street.
Sept. 20, rear car (smoking car),	102	83	49
21, fifth car, 5.30 P.M.,	118	108	63
23, third car, 5.50 P.M.,	110	125	85
27, could not get on,	168	–	–
27, second car, 5.47 P.M.,	150*	150	80
28, 6.15 P.M.,	120	110	50
Oct. 3,	78	89	–
11, cars full,	150*	–	–
Average,	124	–	–

* Estimated.

There are seats for 48 persons in each car.

Every third train during the rush hour, and every fourth train at other times, is an Atlantic Avenue train, switched in at Castle Street, which reduces the headway between trains to about $1\frac{1}{4}$ minutes between Castle and Dudley streets, as shown by the following table:—

Observations of Length of Stop and Interval between Elevated Trains observed at South-bound Dudley Street Station, Oct. 25, 1910.

	6-CAR TRAINS.		Standing (Seconds).	Interval between Trains (Seconds).
	Arrive (P.M.).	Leave (P.M.).		
Dudley Street train, . . .	5.25–30	5.26–35	65	–
Forest Hills train, . . .	5.28–20	5.29–05	45	105
Atlantic Avenue train, . .	5.30–15	5.31–00	45	70
Dudley Street train, . . .	5.32–05	5.32–45	40	65
Forest Hills train, . . .	5.33–50	5.34–30	40	65
Atlantic Avenue train, . .	5.35–25	5.36–15	50	55
Dudley Street train, . . .	5.37–20	5.38–05	45	65
Forest Hills train, . . .	5.40–00	5.41–00	60	115

Trains during this rush hour stop nearly a minute at the station, and take about 34 seconds more in coming to a standstill and in getting the last car past the station after starting.

With the introduction of 8-car trains it seems probable that some other schedule of running may have to be adopted for the safe running of trains. It is difficult, though, to see how the present number of 32 trains per hour can be much exceeded with safety.

An increase of 25 per cent. in capacity can be obtained by running 8-car trains, which is the limit fixed by the Washington Street tunnel platforms. This increase, in ten years, will probably be offset by a like increase in population in the district now tributary to the Washington Street tunnel. If any large outside travel is thrown upon this route the overcrowding will increase in a short time to a condition which may be unbearable.

As an example of additional burdens which may be put on this route, it may be mentioned that it has been proposed to remove the Huntington Avenue baseball grounds to Roslindale. The Boston & Providence Interurban Electric Railway Company has also been granted a certificate of exigency by the Massachusetts Railroad Commission, and proposes to connect its tracks at grade with the Forest Hills station of the Elevated.

SUMMARY OF OBSERVATION ON EXISTING SERVICE.

The present service to South Boston and Dorchester is evidently inadequate. The number of cars during the rush hours is insufficient to prevent overcrowding, and the time taken for the journey must seem long. The present congested condition of the Washington Street tunnel and the Elevated to Dudley Street may be greatly relieved by the construction of a tunnel to Dorchester. It will give the people of that district better facilities, and at the same time allow better service for the district tributary to the Washington Street tunnel.

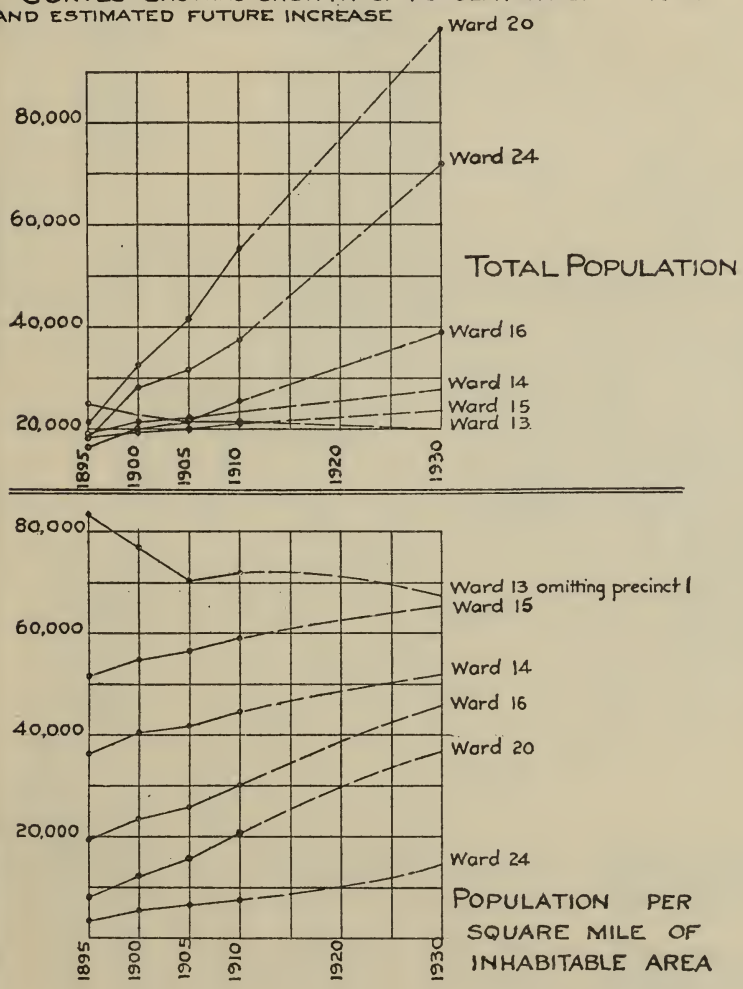
POPULATION.

Diagram C shows the increase in population, and Diagram D shows the density of the population of the district. It will be observed that the population of the South Boston district is very dense, now amounting in Precinct 4 of Ward 13 to over 156,000 per square mile. Only one ward shows a decrease. This does not of necessity indicate a decrease in the number of persons riding to the district, because many large manufacturing plants are operating in South Boston, which bring in people residing outside. It seems probable that this district, with the development of greater dock facilities, will become more and more a commercial and manufacturing center, and that an increasing number of persons will ride back and forth to work from the less thickly settled suburbs. Marine Park will, as in the past, continue to draw large summer crowds.

SOUTH BOSTON AND DORCHESTER

C

CURVES SHOWING GROWTH OF POPULATION SINCE 1895 AND ESTIMATED FUTURE INCREASE

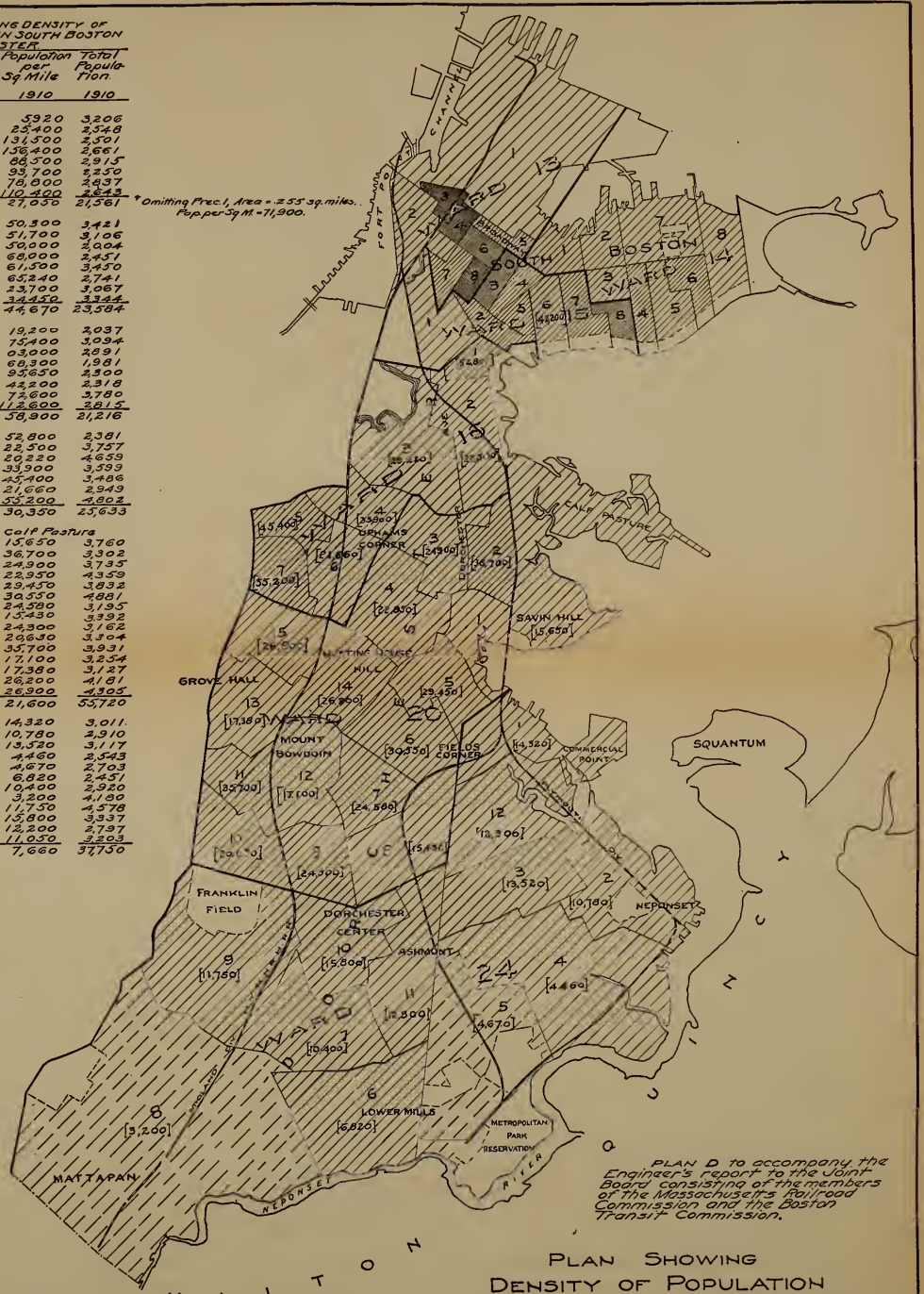


D

TABLE SHOWING DENSITY OF POPULATION IN SOUTH BOSTON AND DORCHESTER

	Area of Inhabitable Land Sq. Miles	Population per Sq. Mile 1910	Total Population 1910
WARD 13			
Precinct 1	.542	5920	3,206
2	.102	25,400	2,568
3	.019	131,500	2,501
4	.017	156,400	2,661
5	.033	88,500	2,915
6	.024	93,700	2,250
7	.036	78,800	2,837
8	.024	110,400	2,643
Total	.797*	27,030	21,561
WARD 14			
Precinct 1	.068	50,300	3,421
2	.060	51,700	3,106
3	.040	50,000	2,004
4	.036	68,000	2,451
5	.056	61,500	3,450
6	.042	65,240	2,741
7	.129	23,700	3,067
8	.097	34,450	3,344
Total	.528	44,670	23,584
WARD 15			
Precinct 1	.106	19,200	2,037
2	.041	75,400	3,094
3	.028	103,000	2,891
4	.029	68,300	1,981
5	.024	95,650	2,300
6	.055	42,200	2,318
7	.052	72,600	3,780
8	.025	112,600	2,815
Total	.360	58,900	21,216
WARD 16			
Precinct 1	.045	52,800	2,381
2	.167	22,500	3,757
3	.230	20,220	4,653
4	.106	33,900	3,599
5	.077	45,400	3,486
6	.136	21,660	2,949
7	.087	55,200	4,802
Total	.848	30,350	25,633
WARD 20			
	.27	Golf Pasture	
Precinct 1	.24	15,650	3,760
2	.09	36,700	3,302
3	.15	24,900	3,735
4	.19	22,950	4,359
5	.13	29,450	3,832
6	.16	30,550	4881
7	.13	24,500	3,185
8	.22	15,430	3392
9	.13	24,300	3,162
10	.16	20,630	3,304
11	.11	35,700	3,931
12	.19	17,100	3,254
13	.18	17,300	3,127
14	.16	26,200	4181
15	.16	26,900	4,305
	2.67	21,600	55,720
WARD 24			
Precinct 1	.21	14,320	3,011
2	.27	10,780	2,910
3	.23	13,520	3,117
4	.57	4,460	2,543
5	.58	4,670	2,703
6	.36	6,820	2,451
7	.28	10,400	2,920
8	.32	3,200	4,180
9	.39	11,750	4,578
10	.21	15,800	3,337
11	.23	12,300	2,797
12	.29	11,030	3,203
Total	4.94	7,660	37,750

* Omitting Prec. 1, Area = .255 sq. miles. Pop. per Sq. M. = 71,900.



PLAN D to accompany the Engineer's report to the Joint Board consisting of the members of the Massachusetts Railroad Commission and the Boston Transit Commission.

Note- Figures inclosed in brackets; thus [10,350] denote population per sq. mile per precinct

PLAN SHOWING DENSITY OF POPULATION IN SOUTH BOSTON AND DORCHESTER

The population of the Dorchester wards, 20 and 24, is rapidly increasing, at the rate of about 55 per cent. in ten years. This part of the city will probably continue to grow for some years at a rate as rapid as during the past decade.

The population of Quincy shows a considerable increase, being 23,890 in 1900 and 32,642 in 1910, or an increase of 23.7 per cent. in ten years.

The population of Milton is only 7,924 at present, but it is a convenient residential district, and the area is large enough to allow for a large increase in the future.

Tables showing the growth of 23 cities and towns within the metropolitan district, together with the estimated population twenty years hence, and the area and population of Boston by wards, are given:—

Areas of Habitable Land and Growth of Population since 1890 of 23 Cities and Towns within the Metropolitan District.

	Habitable Area (Square Miles).	Population.			
		1890.	1900.	1910.	1930.*
CITIES.					
Boston,	34.24	448,477	560,892	670,585	939,800
Cambridge,	5.50	70,000	91,886	104,839	122,200
Chelsea,	2.40	27,909	34,072	32,450	45,000
Everett,	3.75	11,068	24,336	33,484	48,000
Malden,	5.13	23,031	33,664	44,404	71,000
Medford,	7.70	11,079	18,244	23,150	35,000
Melrose,	4.60	8,519	12,962	15,715	28,000
Newton,	18.60	24,379	33,587	39,806	52,000
Quincy,	12.60	16,723	23,899	32,642	51,000
Somerville,	3.84	40,100	61,643	77,236	95,000
Waltham.	13.50	18,707	23,481	27,834	39,000
TOWNS.					
Arlington,	5.00	5,629	8,603	11,184	17,000
Belmont,	4.24	2,098	3,929	5,542	12,000
Brookline,	6.62	12,103	19,935	27,792	47,500
Dedham,	9.90	7,123	7,457	9,284	14,500
Hyde Park,	3.70	10,193	13,244	15,507	16,000
Milton,	10.64	4,728	6,578	7,924	11,100
Needham,	10.00	3,035	4,016	5,026	7,000
Revere,	4.50	5,668	10,395	18,219	34,000
Saugus,	11.00	3,673	5,084	8,047	14,500
Stoneham,	5.50	6,155	6,197	7,090	8,900
Winchester,	6.00	4,861	7,248	9,309	14,000
Winthrop,	2.30	2,726	6,058	10,132	27,500
Totals,	190.26	767,984	1,017,410	1,237,201	1,750,000

* Estimated.

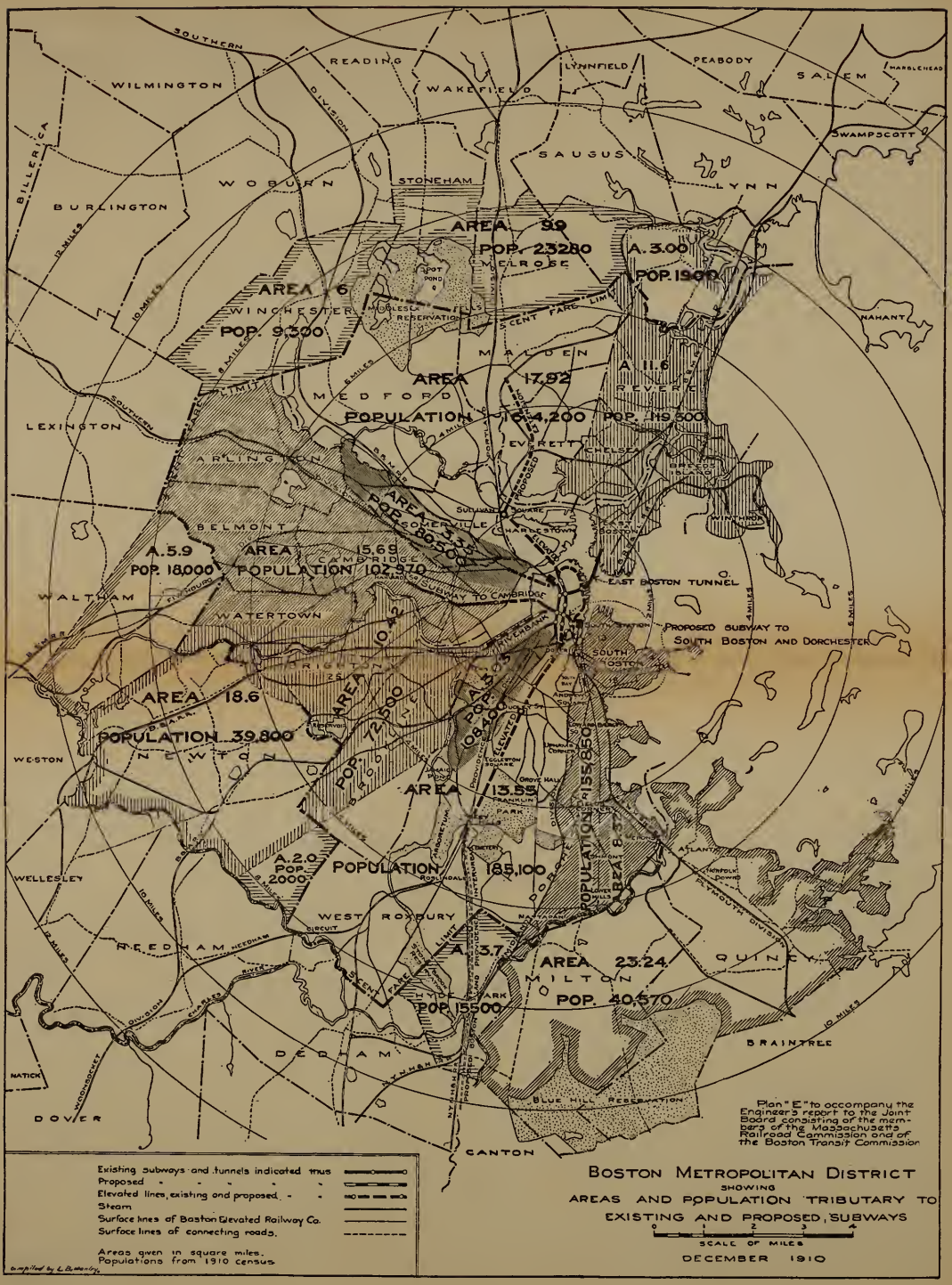
Area and Population of Boston, by Wards, from 1895 to 1930.

Ward.	Habitable Area (Square Miles).	Population.				
		1895.	1900.	1905.	1910.	1930.*
1, ...	1.850	21,007	22,832	25,405	29,676	43,500
2, ...	.560	21,588	22,924	25,929	28,812	41,000
3, ...	.520	13,943	14,564	14,831	15,339	17,000
4, ...	.470	13,375	13,248	12,499	13,294	13,000
5, ...	.310	12,986	12,840	12,653	12,811	13,000
6, ...	.460	27,860	30,546	29,987	35,758	46,000
7, ...	.615	16,973	14,782	15,579	14,913	16,000
8, ...	.259	23,130	28,817	30,810	32,430	34,600
9, ...	.291	23,174	24,583	22,120	26,427	35,000
10, ...	.615	22,554	22,142	23,841	25,320	30,000
11, ...	.997	19,930	19,275	22,353	27,444	40,000
12, ...	.367	21,591	23,641	21,738	24,294	25,000
13, ...	.797	24,900	22,835	21,654	21,561	20,000
14,†	.528	19,186	21,453	22,127	23,584	27,500
15,†	.360	18,623	19,700	20,310	21,216	23,700
16,†	.848	16,320	20,017	21,924	25,633	39,000
17, ...	.661	21,114	25,038	24,313	26,426	34,000
18, ...	.344	21,679	22,401	22,121	22,735	24,000
19, ...	1.190	22,372	27,178	29,213	31,714	41,000
20,†	2.670	21,528	32,556	41,805	55,720	98,500
21, ...	1.000	19,274	23,868	26,533	30,511	45,000
22, ...	1.190	22,289	25,610	27,769	29,975	37,500
23,†	8.600	18,283	23,637	26,410	30,668	74,000
24,†	4.940	18,240	27,126	31,650	37,749	72,000
25,†	3.800	15,001	19,279	21,806	26,575	49,500
Totals, .	34.242	496,920	560,892	595,380	670,585	939,800

* Estimated.

NOTE.— Wards marked † are reduced to net inhabitable areas by deducting parks, cemeteries, etc., from total area.

Plan E shows the various existing and proposed lines of car traffic radiating from the city proper, also areas and population assumed to be tributary to various subways and elevated lines. The appended tables show the areas, present population and the estimated population for 1930.


SOUTHERN DIVISION
READING
WAKEFIELD
LYNNFIELD
PEABODY
SALEM
MARBLEHEAD
SWAMPSCOTT
WILMINGTON
BILLERICA
BURLINGTON
WOBURN
STONEHAM
SAUGUS
LYNN
NAHANT
AREA 9.9
POP. 23280
MELROSE
A. 3.00
POP. 19000
AREA 6
WINCHESTER
POP. 9300
MORSES RESERVATION
MALDEN
AREA 17.92
A 11.6
REVERE
MEDFORD
POPULATION 164,200
POP. 119500
LEXINGTON
EVERETT
CHELSEA
ARLINGTON
AREA 3.35
POP. 80500
SOMERVILLE
BELMONT
A.5.9
POP. 18000
AREA 15.69
CAMBRIDGE
POPULATION 102,970
WALTHAM
EAST BOSTON TUNNEL
WATERTOWN
PROPOSED SUBWAY TO SOUTH BOSTON AND DORCHESTER
BRIGHTON
SOUTH BOSTON
AREA 18.6
POPULATION 39,800
NEWTON
WESTON
AREA 13.55
POPULATION 185,100
A.2.0
POP. 2000
WELLESLEY
WEST ROXBURY
A. 3.7
AREA 23.24
MILTON
POP. 40,570
QUINCY
REDDHAM
HYDE PARK
POP. 15500
BRAINTREE
DEDHAM
NATICK
DOVER
CANTON
BLUE HILLS RESERVATION
Existing subways and tunnels indicated thus
Proposed
Elevated lines, existing and proposed.
Steam
Surface lines of Boston Elevated Railway Co.
Surface lines of connecting roads.
Areas given in square miles.
Populations from 1910 census
compiled by L. Rotherly
Plan "E" to accompany the Engineer's report to the Joint Board consisting of the members of the Massachusetts Railroad Commission and of the Boston Transit Commission
BOSTON METROPOLITAN DISTRICT
SHOWING
AREAS AND POPULATION TRIBUTARY TO
EXISTING AND PROPOSED SUBWAYS
0 1 2 3 4
SCALE OF MILES
DECEMBER 1910

ESTIMATE OF COST.

The estimate of cost for constructing such a subway or tunnel from the South Station to Andrew Square, about 7,800 feet, including a station near Broadway or Dover Street and another in Andrew Square, with cross-overs from one track to another south of the last-named station, is approximately $3,500,000. If it should be deemed advisable to extend the subway to Fields Corner, about 10,200 feet more, with stations near Savin Hill Avenue and at Fields Corner, the cost for constructon would be about $3,500,000 more.

These estimates are exclusive of land damages.

Andrew Square is about 2 miles and Fields Corner is about 4 miles from the Park Street subway station.

Respectfully submitted,

EDMUND S. DAVIS,
Acting Chief Engineer.

TABLE 1.— *Proposed Dorchester and South Boston District.*

TO 5-CENT FARE LIMIT.

LOCALITY.	Area of Habitable Land (Square Miles).	Population, 1905.	Population, 1910.	Population per Square Mile, 1910.	Estimated Population, 1930.
Boston: —					
Ward 13,*	.255	18,000	17,480	68,550	–
Ward 13, ...	.797	21,654	21,561	27,050	20,000
Ward 14, ...	.528	22,127	23,584	44,670	27,500
Ward 15, ...	.360	20,310	21,216	58,930	23,760
Ward 16,†	.684	–‡	17,345	25,360	31,470
Ward 20,§	2.060	–‡	41,053	19,930	75,250
Ward 24,‖	3.890	–‡	31,082	7,990	56,880
Totals, ...	8.319	–	155,841	18,720	234,860

OUTSIDE 5-CENT FARE LIMIT.

Milton, ...	10.640	7,054	7,924	745	11,000
Quincy, ...	12.600	28,076	32,642	2,590	51,000
Totals, ...	23.240	35,130	40,566	1,750	62,000
Totals for District, .	31.559	–	196,407	6,220	296,860

* Omitting Precinct 1.
† Omitting precincts 5 and 7.
‡ Precincts changed in 1895.
§ Omitting precincts 10, 11, 13 and 15.
‖ Omitting one half of precincts 8 and 9.

TABLE 2.— *Roxbury and West Roxbury District (Washington Street Tunnel Route).*

TO 5-CENT FARE LIMIT.

LOCALITY.	Area of Habitable Land (Square Miles).	Population, 1905.	Population, 1910.	Population per Square Mile, 1910.	Estimated Population, 1930.
Boston:—					
Three-quarters of Ward 9,	.218	16,590	19,820	90,920	26,250
One-half of Ward 12,	.183	10,869	12,147	66,380	12,250
Part of Ward 16,	.164	7,300	8,288	50,540	7,500
Ward 17,	.661	24,313	26,426	39,980	34,000
One-half of Ward 18,	.172	11,060	11,367	66,090	12,000
Part of Ward 20,	.610	10,870	14,667	24,040	23,000
Ward 21,	1.000	26,533	30,511	30,510	45,000
Three-quarters of Ward 22,	.890	20,825	22,481	25,260	28,500
Ward 23,	8.600	26,410	30,668	3,570	74,000
Part of Ward 24,	1.050	7,260	8,757	8,340	15,000
Totals,	13.548	162,030	185,132	13,665	277,500
OUTSIDE 5-CENT FARE LIMIT.					
Part of Brookline,	2.000	1,660	2,000	1,000	4,000
Hyde Park,	3.700	14,510	15,507	4,190	16,000
Totals,	5.700	16,170	17,507	3,070	20,000
Totals for district,	19.248	178,200	202,639	10,530	297,500

TABLE 3.— *Riverbank District.*

TO 5-CENT FARE LIMIT.

LOCALITY.	Area of Habitable Land (Square Miles).	Population, 1905.	Population, 1910.	Population per Square Mile, 1910.	Estimated Population, 1930.
One-half of Ward 11, Boston,	.50	11,177	13,722	27,440	20,000
Ward 25, Boston (Brighton),	3.80	21,806	26,575	6,990	49,500
Part of Brookline,	4.62	21,770	25,792	5,580	43,500
One-half of Watertown,	1.50	5,630	6,400	4,270	8,500
Totals,	10.42	60,383	72,489	6,960	121,500
OUTSIDE 5-CENT FARE LIMIT.					
Newton,	18.60	36,827	39,806	2,140	52,000
Totals for district,	29.02	97,210	112,295	3,870	173,500

TABLE 4. — *Cambridge District.*

TO 5-CENT FARE LIMIT.

LOCALITY.	Area of Habitable Land (Square Miles).	Population, 1905.	Population, 1910.	Population per Square Mile, 1910.	Estimated Population, 1930.
Cambridge (except part given in Table 7).	4.95	74,000	79,839	16,130	92,200
Arlington, ...	5.00	9,668	11,187	2,240	17,000
Belmont, ...	4.24	4,360	5,542	1,310	12,000
One-half of Watertown, .	1.50	5,630	6,400	4,270	8,500
Totals, ...	15.69	93,658	102,968	6,560	129,700
OUTSIDE 5-CENT FARE LIMIT.					
Part of Waltham, . .	5.90	16,900	18,000	3,050	25,000
Totals for district, .	21.59	110,558	120,968	5,600	154,700

TABLE 5.— *North Washington Street Tunnel District (Sullivan Square-Elevated Route).*

TO 5-CENT FARE LIMIT.

LOCALITY.	Area of Habitable Land (Square Miles).	Population, 1905.	Population, 1910.	Population per Square Mile, 1910.	Estimated Population, 1930.
Charlestown: —					
Ward 3, ...	.518	14,831	15,339	29,610	17,000
Ward 4, ...	.470	12,499	13,294	28,285	13,000
Ward 5, ...	.313	12,653	12,811	40,930	13,000
Everett, ...	3.750	29,111	33,484	8,930	48,000
Malden, ...	5.130	38,037	44,404	8,655	71,000
Medford, ...	6.700	19,686	23,150	3,455	35,000
Part of Somerville, . .	1.040	17,320	21,736	20,900	24,000
Totals, ...	17.921	144,137	164,218	9,160	221,000
BEYOND 5-CENT FARE LIMIT.					
Melrose, ...	4.600	14,295	15,715	3,420	28,000
Part of Saugus, . . .	2.000	3,120	4,020	2,010	7,000
Part of Stoneham, . .	3.300	3,160	3,545	1,070	7,000
Winchester, ...	6.000	8,240	9,300	1,550	14,000
Totals, ...	15.900	28,815	32,580	2,050	56,000
Totals for district, .	33.821	172,952	196,798	5,820	277,000

TABLE 6.— *East Boston Tunnel District.*

LOCALITY.	Area of Habitable Land (Square Miles).	Population, **1905.**	Population, **1910.**	Population per Square Mile, **1910.**	Estimated Population, **1930.**
East Boston:—					
Ward 1, ...	1.85	25,405	29,676	16,040	43,500
Ward 2, ...	.55	25,925	28,812	52,385	41,000
Chelsea, ...	2.40	37,289	32,452	13,520	45,000
Revere, ...	4.50	12,659	18,219	4,050	34,000
Winthrop, ...	2.30	7,034	10,132	4,400	27,500
Part of Saugus, ...	3.00	1,700	1,900	633	3,800
Totals, ...	14.60	110,012	121,191	8,300	194,800

TABLE 7.— *Subway Districts.*

SOUTH SUBWAY DISTRICT.

LOCALITY.	Area of Habitable Land (Square Miles).	Population, **1905.**	Population, **1910.**	Population per Square Mile, **1910.**	Estimated Population, **1930.**
Boston:—					
One-quarter of Ward 9, .	.073	5,530	6,607	90,510	8,750
Ward 10, ...	.615	23,840	25,320	41,170	30,000
One-half of Ward 11, .	.500	11,176	13,722	27,440	20,000
One-half of Ward 12, .	.184	10,869	12,147	66,020	12,250
One-half of Ward 18, .	.172	11,060	11,368	66,090	12,000
Ward 19, ...	1.190	29,213	31,714	26,650	41,000
One-quarter of Ward 22, .	.300	6,942	7,494	24,980	9,500
Totals, ...	3.034	98,630	108,372	35,720	133,500

NORTH SUBWAY DISTRICT (EAST CAMBRIDGE ELEVATED ROUTE).

Part of Somerville, . .	2.800	51,950	55,500	19,790	71,000
East Cambridge, . . .	.550	23,380	25,000	45,455	30,000
Totals, ...	3.350	75,330	80,500	24,030	101,000

Summary of Subway Districts.

TO LIMIT OF 5-CENT FARE, NOT INCLUDING ONE-HALF OF WARD 11 OR WARDS 6, 7 AND 8.

TABLES.	Districts.	Habitable Area (Square Miles).	POPULATION.	
			1910.	1930.*
Table 1, . .	Dorchester and South Boston, .	8.319	155,841	234,860
Table 2, . .	Roxbury and West Roxbury, .	13.548	185,132	277,500
Table 3, . .	Riverbank, ...	10.420	72,489	121,500
Table 4, . .	Cambridge, ...	15.690	102,968	129,700
Table 5, . .	North Washington Street tunnel,	17.921	164,218	221,000
Table 6, . .	East Boston tunnel, . . .	14.600	121,191	194,800
Table 7, . .	South Subway, ...	3.034	108,372	133,500
Table 7, . .	North Subway, ...	3.350	80,500	101,000
Totals, . .	. . . . .	86.882	990,711	1,414,860

TO 8-MILE LIMIT (APPROXIMATE).

Table 1, . .	Dorchester and South Boston, .	31.560	196,407	297,860
Table 2, . .	Roxbury and West Roxbury, .	19.248	202,639	297,500
Table 3, . .	Riverbank, ...	29.020	112,295	173,500
Table 4, . .	Cambridge, ...	21.590	120,968	154,700
Table 5, . .	North Washington Street tunnel,	33.820	196,798	277,000
Table 6, . .	East Boston tunnel, . . .	14.600	121,191	194,800
Table 7, . .	South Subway, ...	3.034	108,372	133,500
Table 7, . .	North Subway, ...	3.350	80,500	101,000
Totals, . .	. . . . .	156.222	1,139,170	1,629,860

* Estimated.

APPENDIX H.

THE COMMONWEALTH OF MASSACHUSETTS.

To the Senate and House of Representatives.

Chapter 139 of the Resolves of 1910 reads as follows: —

RESOLVES RELATIVE TO THE IMPROVEMENT OF TRANSPORTATION FACILITIES IN AND AROUND THE CITY OF BOSTON.

Resolved, That the board of railroad commissioners and the Boston transit commission, sitting jointly, be requested to investigate and report in print to the general court, on or before the second Saturday of January, nineteen hundred and eleven, whether or not in their opinion it is advisable, expedient, and in the public interest:

First. To provide for the acquisition by the Boston Elevated Railway Company of stocks and bonds of other street railway companies, or for the acquisition of the property and rights of other street railway companies in any other way.

Second. To provide in advance of the expiration thereof for extensions of the existing contracts for the use of the Tremont street subway, the Washington street tunnel, and the East Boston tunnel, and if so, on what terms and conditions, and for what period of time.

Third. To provide for further modifications of chapter five hundred and fifty-one of the acts of the year nineteen hundred and eight, or to provide by any other method, and if so, by what method, for continuing the advantages of a single control of the systems of the Boston Elevated Railway Company and the West End Street Railway Company.

The said joint board is requested to give public hearings in regard to said matters, and to report the result of its investigation to the general court on or before the second Saturday of January, nineteen hundred and eleven, with such recommendations as the joint board may deem advisable in view of previous investigations and the investigation to be made in the pursuance of this resolve. And the joint board is also requested to submit with its report drafts of a bill or bills embodying any recommendations which it may make.

And further resolved, That the board of railroad commissioners be joined with the Boston transit commission in the investigation and reports to be made under chapters ninety-four and ninety-seven of the resolves of the year nineteen hundred and ten. [*Approved June 14, 1910.*

In compliance with this resolve, the Board of Railroad Commissioners and the Boston Transit Commission, sitting jointly, have held public hearings, duly advertised, and have carefully considered the matters referred to them, and submit a separate report on each of the three divisions of the resolve.

REPORT ON THE FIRST DIVISION.

The first reference under chapter 139 covers the inquiry whether it is "advisable, expedient, and in the public interest": —

Holding of Stocks and Consolidation.

To provide for the acquisition by the Boston Elevated Railway Company of stock and bonds of other street railway companies, or for the acquisition of the property and the rights of other street railway companies in any other way.

Chapter 85 of the Resolves of 1909 made a similar but more restricted reference to this Joint Board, as follows: —

To authorize the Boston Elevated Railway Company to acquire and hold the stock and securities of other street railway companies, elevated railroads or electric railroads, and if so, under what conditions and limitations.

Under this reference the Joint Board made a report to the General Court of 1910 under date of Jan. 8, 1910 (Senate Document, No. 22), containing a somewhat full discussion of the subject matter of the inquiry, and arriving at the general conclusion that "a holding bill should be enacted, permitting the Boston Elevated Railway Company to acquire and hold the stock of other street railway companies." The resolve did not request the Joint Board to report a draft bill for the consideration of the General Court, but the Board specified certain essential considerations and limitations under which such authorization should be given. These conditions are now embodied in a draft bill for the consideration of the General Court, hereto annexed, and marked Appendix A.

The Joint Board has now reviewed the conclusions found in its report of Jan. 8, 1910, above referred to, and desires to re-state its conviction that the passage of such a holding bill, properly safeguarded as therein indicated, would be in the public interest.

The resolve of the present year contains the additional inquiry whether it is "advisable, expedient, and in the public interest" to provide for "the acquisition of the property and rights of other street railway companies in any other way." The only other way presenting elements of feasibility would be consolidation.

In its report of last year the Joint Board, after a review of the history of transportation in Boston and its suburbs, declared that "it would appear that the consolidation of the Boston Elevated Railway Company with one or more of the street railway companies whose lines connect with it, properly safeguarded, would present substantial public advantages."

Consolidation of street railway companies is now permitted under the provisions of Statutes of 1906, chapter 463, part III., sections 52, 53 and 54, such consolidations being subject to the approval of the Board of Railroad Commissioners, as provided by section 67, of part I. of the same chapter, as amended.

It was then assumed, and it is now well understood, that, by virtue of the existing relations by way of contract and lease between the company and the Commonwealth and the city of Boston, the general laws relative to consolidation of street railway companies cannot practically be availed of; and in the report of last year these relations were carefully reviewed, for the purpose of ascertaining whether some other method which obviated the difficulties could be devised in lieu of consolidation, to be put into effect under some special statute that would adequately protect the public interests. It was not then held nor is it now contended that, if the suggested difficulties could be properly overcome, a consolidation might not be equally effective and afford full protection to all parties in interest.

The question now before the Joint Board is whether consolidation by special act presents such elements of feasibility and practicability as to be incorporated in the draft bill appended.

For the purpose of answering this question we have re-examined all the evidence upon which the conclusions of our last year's report were founded, and in addition have given the subject further consideration. While it has always been conceded that a special consolidation bill could be drafted, it must also be admitted that no action can be required under such bill without the consent of the Boston Elevated Railway Company; an act providing for consolidation, which would necessarily have to be permissive, would remain inoperative unless accepted.

The Joint Board, however, deems it advisable to include a special provision relative to consolidation and this is embodied in section 7 of the draft bill. This section, taken as a whole, is in aid of consolidation, and

will tend, on or before the expiration of the contract between the Commonwealth and the Boston Elevated Railway Company, to bring about consolidation of all those companies in which the Boston Elevated Railway Company may become a stockholder; for in case such consolidation is not effected, the Boston Elevated Railway Company must, by Jan. 1, 1924, cease to be a stockholder, and dispose of any stocks or bonds of other street railway companies which it may then hold. The bill therefore has many of the merits of a special consolidation statute, without any of the defects which must necessarily attach to such an act without the holding provisions.

WALTER PERLEY HALL, *Chairman,*
GEORGE W. BISHOP,
CLINTON WHITE,
Board of Railroad Commissioners.

GEORGE G. CROCKER,
GEORGE F. SWAIN, *Secretary,*
HORACE G. ALLEN,
JOSIAH QUINCY,
JAMES B. NOYES,
Boston Transit Commission.

JAN. 14, 1911.

REPORT ON THE SECOND DIVISION.

Extension of Tunnel and Subway Leases.

The second reference under chapter 139 covers the inquiry whether it is "advisable, expedient, and in the public interest": —

To provide in advance of the expiration thereof for extensions of existing contracts for the use of the Tremont street subway, the Washington street tunnel and the East Boston tunnel, and if so, on what terms and for what period of time.

The Joint Board is unanimously of opinion that it is advisable, expedient, and in the public interest to provide in advance of the expiration thereof for extensions of such existing contracts.

While the resolve does not in terms refer to leases of the Cambridge tunnel connection under Beacon Hill, and of the Riverbank subway, both of which are authorized, but not yet executed, the Joint Board has included such leases in its consideration of the above reference, believing that all leases of tunnels and subways now constructed or authorized should be dealt with together, and included in one comprehensive plan.

It is of the greatest importance alike to the city of Boston, the Boston Elevated Railway Company and the travelling public, that financial relations connected with subway and tunnel leases should be definitely fixed, not only for the present but for a considerable future period, and that such financial relations should be established upon a basis consistent with adequate provision for meeting present and future needs for extensions of the underground system of rapid transit. The established policy of the Commonwealth, accepted by the city of Boston, has placed the city in the position of financing the construction of subways and tunnels; proposals are before the Legislature, and are recommended in other reports of this Joint Board, for the construction of extensions of the system to meet present needs, and the demands of the not remote future may require still further extensions. In the opinion of the Joint Board, the present is an opportune time for establishing a new and more permanent status between the city of Boston and the Boston Elevated Railway Company and this seems urgently needed.

An important, if not an essential, feature of such new status should be the fixing of a uniform date upon which leases, not only of existing subways and tunnels but of the new subways and tunnels to be constructed in

accordance with pending proposals above referred to, should expire. Whether the city is to deal with two or more possible tenants, or with only a single possible tenant,— as it might be obliged to do if the consolidation of the Boston Elevated Railway Company with the West End Street Railway Company, which this Joint Board recommends below, is effected, — we believe that the city will be in a better position if it has the power to lease a system of subways and tunnels from a uniform date, than if it is obliged to lease isolated subways and tunnels from time to time as leases may expire.

The Joint Board is of opinion that it is highly desirable, alike in the interest of the city of Boston, the Boston Elevated Railway Company and the travelling public, which needs an extension of rapid transit facilities, that finances of subway and tunnel construction, including both those completed and those proposed, should be placed upon such a basis as to provide for the payment at maturity, without renewal, of all bonds heretofore or hereafter issued by the city for subway and tunnel purposes. If the Boston Elevated Railway Company executes leases under such a plan, the city is assured, to the extent of the financial ability of that company, that its obligations incurred for the construction of subways and tunnels will be provided for, and that, after the expiration of the term thus established, the underground rapid transit system will become a free asset of the city.

It is obvious that the longer the term allowed for the payment of bonds issued for the construction of subways and tunnels, the smaller will be the annual contribution by way of rental which it is necessary for the lessee — and in the last analysis this means the travelling public —to pay. The Joint Board is therefore of opinion that the uniform date at which all such obligations are to be finally extinguished should be placed at such period as will afford complete security to the city, and will at the same time impose no undue burden either upon the lessee or upon the travelling public, from which the lessee draws the receipts necessary to meet its rental obligations under the leases. The calculation of such term requires the estimate of two factors, neither of which can now be fixed with certainty.

The first factor is the rate of interest which the city will have to pay upon the bonds to be issued for the construction of proposed additional subways and tunnels; and the second factor is the rate of interest which will be realized in the future from the sinking fund established for the retirement of existing and future loans for subway construction. The Joint Board does not believe, therefore, that any date certain should now be fixed at which, under the financial plan proposed, all bonds should be retired. The Joint Board believes that a provision for an extension period of twenty-five years, in connection with a further provision for determining by arbitration at the end of this period both the length of the further period and the rate of rental required in order to accomplish the above-named object of providing for the retirement of all bonds, affords the best practicable method of dealing with this matter.

The Joint Board is of opinion that the question of extending the existing leases should not be dealt with by itself, but in connection with and as a part of a comprehensive plan for unifying the finances of subway and tunnel construction. Such a plan has been worked out, and the Joint Board now presents the same for the consideration of the Legislature in the draft bill hereto annexed.

This bill (Appendix B) provides, in the first place, for a twenty-five-year period of extension of the three existing leases, namely, of the Tremont Street subway, of the East Boston tunnel and of the Washington Street tunnel, so that the same will all expire on July 1, 1936. Provision is also made that the lease of the Beacon Hill tunnel, now under construction, and the lease of the Riverbank subway, the construction of which is authorized but not yet begun, shall expire at the same date. This would extend the lease of the Tremont Street subway for about nineteen years, the lease of the East Boston tunnel for about fourteen years, and the lease of the Washington Street tunnel for about three years; and it would extend the lease of the Beacon Hill tunnel, if such lease is made in 1912

to run for twenty years from its opening for use, as now authorized by law, for about four years. On the other hand, the lease of the Riverbank subway is now authorized to be made for twenty-five years from its opening for use and if so opened in the year 1914 the lease would not expire until 1939, so that the fixing of the above common date of expiration would shorten this lease for about three years. It is also proposed that the lease of the proposed tunnel to the South Station and thence to Andrew Square, if the construction of such tunnel is authorized, should expire at the same date, July 1, 1936, which would make the length of the lease of this tunnel not over twenty-two years from the date of its opening for use.

The bill makes no change in the rates of rental payable under existing leases until after such leases have expired. From and after the respective dates of expiration the rental is fixed at the uniform rate of 4½ per cent. per annum for all subways now constructed or authorized, and it is further assumed that the same rate of rental will be fixed for the new tunnel to Andrew Square above referred to, if its construction is authorized. The Joint Board has thought it proper to adopt such 4½ per cent. rate of rental as the basis of its calculations, in view of the fact that this is the rate established by the Legislature for the lease of the Washington Street tunnel and for the lease of the Riverbank subway. The bill only establishes this rate of rental, however, until July 1, 1936; and in view of the difficulty of foreseeing rates of interest and other future conditions, it has seemed to the Joint Board wise not to undertake to fix a definite rate of rental for a longer period than twenty-five years.

For the purpose of giving the city the right to require such further extension as may be found necessary to provide for the retirement of all its subway and tunnel bonds at maturity, a clause is inserted providing for the determination, to be made by the same arbitrators who fix the rate of rental after 1936, of the question how long an extension is necessary to accomplish the above object. It seems to the Joint Board far better to leave the determination of this question to such arbitrators, acting in the light of conditions existing in 1936, by which time material changes may have taken place in the rate of return on sinking funds, than to undertake to fix at the present time the total term of years required to insure the payment of such bonds. The period of such extension beyond 1936 is, however, limited to twenty-five years at the maximum, so that in no case can the total extension exceed the term of fifty years, which recent legislation of the State of New York has fixed as a proper term for the leasing of subways and tunnels within the city of New York. The term of the second extension will, however, upon the basis of the best financial calculations as to probable rates of interest which can now be made, be considerably shorter than the maximum term of twenty-five years. The arbitrators are allowed full discretion to fix the rental to be paid during the extension at such rate as may seem to them reasonable, in view of all conditions then existing; the only restriction placed upon them is that the term and rate of rental shall in combination insure the retirement of all bonds at or before maturity. We believe that such a provision gives the city absolute protection for its investment in underground rapid transit facilities as long as the Boston Elevated Railway Company remains a solvent corporation, able to meet its obligations; such a plan is also of value to the company, and should strengthen its ability to provide for the further financing which is required to meet the needs of public travel within the metropolitan district.

The operation of the act is made dependent upon three conditions, expressed in the last section.

First, within three months of its passage it must be accepted by the city of Boston, acting by the mayor and the city council.

Second, the act becomes null and void, even if accepted by the city, unless a consolidation of the systems of the Boston Elevated Railway Company and of the West End Street Railway Company is effected within one year from the date of the passage of the act. The Joint Board deems this condition of vital importance and would not recommend any extensions of leases at the present time except subject thereto. The question

of granting such extensions is a very different one if such action is to be taken subject to the contingency that after the year 1922 two separate and more or less competitive systems of local transportation may be in operation in Boston. If such a situation is to exist, the city may well postpone as long as possible committing itself to any policy in respect to the disposition of its subways and tunnels when present leases expire. Not to mention other considerations, the financial resources and responsibility of a lessee of the underground rapid transit system, enjoying a practical monopoly of underground, surface and elevated transportation in Boston and a large part of the metropolitan district, will certainly be much greater than those of either one of two companies operating independent and partly competing systems. The Joint Board has unanimously recommended the consolidation of these two companies in a preceding section of this report. Furthermore, before making a further investment of some $10,000,000 in subways and tunnels, as already recommended by the Joint Board in other reports, the city may reasonably ask to have the question settled whether the Boston Elevated Railway Company, the West End Street Railway Company, or a consolidated company, is to be the lessee in each case after 1922.

Third, the act expressly makes the proposed extensions of leases conditional upon the passage of legislation authorizing the construction of the tunnels recommended by the Joint Board in another report to the Legislature, namely, from Park Street to the South Station, as an extension of the Cambridge subway, with its tunnel connection under Beacon Hill, and from the South Station to South Boston and Andrew Square, and upon the execution by the Boston Elevated Railway Company of leases of the same. If the leasing of these tunnels at 4½ per cent. upon their cost is to be regarded, as the company itself contends, as imposing an additional financial burden upon the Boston Elevated Railway Company, rather than as granting further valuable privileges to the company, then the assumption of such an obligation should be required as one feature of a comprehensive general plan for the extension of leases; for such a plan, while desirable from the standpoint of giving fuller protection to the investment of the city of Boston than it now enjoys in respect to the ultimate payment in full of the debt incurred for the underground rapid transit system, is also unquestionably of benefit to the company, through giving greater stability to its tenure, and enabling it to make more definite financial calculations, extending over a longer period of time.

The plan embodied in the act is therefore offered by the Joint Board as a complete whole, the various features and terms of which are to be considered together, and not as separate or independent proposals.

The arbitration clause of the act as drafted provides for the appointment of all three arbitrators by the chief justice of the Supreme Judicial Court; but any other method of selecting three arbitrators, which is fair and certain in its operation, would be satisfactory.

Mr. George G. Crocker is unable to agree with the rest of the Joint Board upon certain conclusions reached in the latter part of this report. His views are therefore appended.

WALTER PERLEY HALL, *Chairman,*
GEORGE W. BISHOP,
CLINTON WHITE,
Board of Railroad Commissioners.

* GEORGE G. CROCKER,
GEORGE F. SWAIN, *Secretary,*
HORACE G. ALLEN,
JOSIAH QUINCY,
JAMES B. NOYES,
Boston Transit Commission.

JAN. 14, 1911.

** Dissenting Statement of George G. Crocker.*

Agreeing with the report of the Joint Board that there is urgent need for establishing a more permanent status between the city of Boston and the Boston Elevated Railway Company as to subways and tunnels; that it is desirable that more definite provision should be made for payment at maturity of bonds which have been issued for subway and tunnel construction and those which may be issued for such construction already authorized or now in contemplation, and that the proper way to secure this result is through an extension of leases now existing or authorized, upon such terms and conditions as may seem appropriate, — I differ from my associates as to the terms and conditions proposed by them: first, because the rental on extensions of the said leases, which by the report is fixed until 1936 at $4\frac{1}{2}$ per cent. on the cost, is insufficient; and, second, because the plan proposed, while it does not require, nevertheless contemplates, and naturally will result in, the fixing of rentals from 1936 on a basis which will not wipe out the indebtedness of the city until twenty-five years from 1936, or, in other words, until 1961.

The contract for the use of the Tremont Street subway runs for a period of twenty years from 1897, at a rental of $4\frac{7}{8}$ per cent. on its net cost. This rental, if continued for the full term of the bonds, which term was fixed by statute (St. 1894, c. 548, § 37) at forty years, would be more than sufficient to pay the interest on the bonds and to create a sinking fund adequate to retire the bonds at their maturity.

In 1897 the construction of the East Boston tunnel was authorized. The rental reserved by the act for a term ending in 1922 was made up of two elements, the first of which was the payment by the Boston Elevated Railway Company of three-eighths of 1 per cent. of its gross earnings, and the other a toll of 1 cent per passenger using the tunnel. The amount now being realized from these two sources is more than sufficient to meet the interest and sinking fund requirements for that bond issue.

As in 1894, the statute fixed the term of the bonds at forty years (St. 1897, c. 500, §§ 17, 18).

The next tunnel indebtedness was that incurred for the Washington Street tunnel (St. 1902, c. 534, § 10). Unlike the statutes above referred to, this act provided for issuing bonds "for such terms, not exceeding fifty years, as the mayor and treasurer of said city may determine." Under this discretionary authority no bonds have been issued which run for a term of more than forty years The rental was fixed by the statute at $4\frac{1}{2}$ per cent. on the net cost. The condition of the money market was such at the time of the passage of the act that the city was able to sell its bonds on a $3\frac{1}{4}$ per cent. basis. On that basis a $4\frac{1}{2}$ per cent. rental left a sufficient balance for the sinking fund requirements on a forty-year bond. Unfortunately, the money market soon thereafter began to harden, and when the money was needed to carry on the work, city bonds could not be sold on the average on a lower basis than 3.69 per cent. On this basis the balance of a $4\frac{1}{2}$ per cent. rental available each year for the sinking fund is only .81 per cent., which is insufficient to retire forty-year bonds at their maturity.

By St. 1906, c. 520, § 23, the construction of what is known as the Cambridge connection for the tunnel under Beacon Hill was authorized, and it was provided that it should be leased for a term of not less than twenty years from its opening for use, at an annual rental equal to $4\frac{7}{8}$ per cent. of its net cost. The bonds are required to be forty-year bonds. The contract has not yet been executed.

Next in order was the act to provide for the construction of the east and west tunnel and subway in the city of Boston (St. 1907, c. 573). This subway is known as the Riverbank subway. Under the provisions of the act it is to be leased for a term of twenty-five years from the beginning of its use, at an annual rental equal to $4\frac{1}{2}$ per cent. on the net cost. This act, like that of 1902, provides that the bonds to be issued to meet the cost of construction shall be for such terms, not exceeding fifty years, as the mayor and the city treasurer may determine. The lease has not yet been executed.

So far, then, as relates to the term of the bonds issued by the city to

meet the cost of the several subways and tunnels, it appears that the statutes require those issued for the Tremont Street subway, the East Boston tunnel and the Cambridge connection to be forty-year bonds, and permits those issued for the Washington Street tunnel and the Riverbank subway to be for terms not exceeding fifty years. The Legislature has not in any case determined that subway or tunnel bonds shall be issued for terms exceeding forty years, but in two acts it has given to the city authorities discretionary power up to fifty years. Under this discretionary power the mayor and the city treasurer have in all cases limited the term to forty years.

It also appears that in the act providing for the construction of the Tremont Street subway the Legislature left to the Boston Transit Commission the question of determining the rental; that in two other cases it has definitely fixed the rental at $4\frac{1}{2}$ per cent., and in one at $4\frac{7}{8}$ per cent., on the net cost.

In any event, the situation is such as to create no restraint upon the members of the Joint Board as to recommending what they deem to be expedient.

The average rate paid by the city of Boston, thus far, for money used in the construction of the Tremont Street subway, the Washington Street tunnel, and the East Boston tunnel, has been 3.566 per cent. To establish a sinking fund adequate to amortize debt in forty years, assuming that the income of the sinking fund amounts to $3\frac{1}{2}$ per cent. per annum, calls for an annual payment of 1.143 per cent. Hence, under such circumstances, to provide for the payment of interest and sinking fund requirements calls for a rental equal to the sum of these two, or approximately $4\frac{3}{4}$ per cent. per annum. An estimate by a recognized authority in such matters, furnished at the request of the Joint Board by the Boston Elevated Railway Company, shows that, if the existing contracts for the use of subways and tunnels, and those contracts now authorized by law but not yet executed, are each extended beyond the time fixed by their terms or by statute to the first of July, 1950, at a rental during such extension equal to 4.75 per cent. on the cost, and if the proposed act in relation to the construction of a tunnel to the South Station and to South Boston provides for a lease of the same to the Boston Elevated Railway Company for a term ending on said first of July, 1950, at the same rental, and if the various loans are consolidated, as proposed in the act submitted herewith (Appendix C), the rentals would be sufficient to meet the interest on the bonds issued and to be issued, and to provide sinking funds adequate to retire such indebtedness on said date.

A consolidation of loans on this basis would be an indication of the policy of the Commonwealth to adhere to a rental system adequate to pay forty-year bonds at their maturity, and would not be an indication, as is the report of the committee, that the financial scheme which was adopted when the city entered upon the construction of tunnels should be changed by issuing bonds for longer terms and fixing correspondingly reduced rentals.

If the various contracts for the use of the subways and tunnels above referred to are made to terminate on the 1st of July, 1950, the average term of use will be about forty years; that is, the use of the Cambridge connection will be for only thirty-eight years, that of the Riverbank subway and the tunnel to South Station and South Boston for about thirty-five years; while, on the other hand, the term of use of the Tremont Street subway will be fifty-three years, and that of the Washington Street tunnel forty-two years.

GEORGE G. CROCKER.

JAN. 14, 1911.

REPORT ON THE THIRD DIVISION.

Consolidation of the Boston Elevated and West End Street Railway Companies.

The third reference under chapter 139 covers the inquiry whether or not, in its opinion, it is "advisable, expedient, and in the public interest":—

To provide for further modifications of chapter five hundred and fifty-one of the acts of the year nineteen hundred and eight, or to provide by any other method, and if so, by what method, for continuing the advantages of a single control of the systems of the Boston Elevated Railway Company and the West End Street Railway Company.

St.1908, c. 551, provided for the consolidation of the West End Street Railway Company and the Boston Elevated Railway Company; the exchange of the preferred stock of the West End Street Railway Company for first preferred stock of the Boston Elevated Railway Company, to the same par value, bearing cumulative dividends at the rate of 8 per cent. per annum; and the exchange of the common stock of the West End Street Railway Company for second preferred stock of the Boston Elevated Railway Company, to the same par value, bearing cumulative dividends at the rate of 7 per cent. per annum.

The General Court of 1909 by a resolve (chapter 85) requested the Joint Board now sitting to report whether, in its opinion, it was "advisable, expedient, and in the public interest," among other things, "to amend chapter five hundred and fifty-one of the acts of the year nineteen hundred and eight by providing for a distribution of any of the assets of the West End Street Railway Company among its stockholders, or by changing the terms and conditions of the first and second preferred stock to be issued by the Boston Elevated Railway Company, and, if so, in what manner and to what extent."

In its report to the General Court of 1910 (Senate Document, No. 22), in response to this resolve, the Joint Board stated its opinion:—

First.— That it is not advisable, expedient or in the public interest to amend chapter 551 of the Acts of the year 1908 by providing for a distribution of any of the assets of the West End Street Railway Company among its stockholders. The Board unanimously adheres to this recommendation.

Second.—That the rate of dividend on the second preferred stock as named in the act (7 per cent.) is not unjust to the West End Street Railway Company stockholders, but, on the contrary, is amply liberal. This subject is referred to below.

Third.—That the act be amended by inserting in section 2, after the words "outstanding at the date of purchase," where these words appear the third time, the words, "No other stock shall hereafter be issued, either preferred or equal to such first preferred or second preferred stock, without the consent of two-thirds of the holders of such stocks respectively." The Board unanimously adheres to this recommendation.

The form of the question submitted in the reference of 1910 assumes the advantages of a single control of these two systems, and these are, indeed, so obvious that no argument is required to demonstrate them. A single control exists to-day under the present lease, and will continue to exist until its expiration, eleven years hence.

There are clearly two methods, and only two, by which a continuance of this single control can be assured: these are either a long extension of the present lease with or without amendment, or a consolidation of the two companies. We understand that we are asked, among other things, which of these two methods would in our opinion be the better, and we answer, emphatically, consolidation.

The Resolves of 1909 above referred to did not include the question of consolidation within the reference, but in its report the Joint Board made the following statement:—

The two companies agree that it is the interest of the public that a consolidation take place, and that material economies can be effected thereby. In this view the Joint Board concurs.

The Joint Board now reiterates the opinion then expressed. We also refer in this connection to the special report made by the Board of Railroad Commissioners to the Legislature on March 30, 1908, and printed in its fortieth annual report (pp. 160–176). In answer to the question, what

public benefits, if any, would accrue from a bill providing for the consolidation of the properties of the two companies, that Board gave its opinion that "a single management should control the operation of these systems," for reasons which were fully set forth; and further stated that, while the question of consolidation rather than lease was not then before the Board, it "would have no hesitancy in declaring for the consolidation." The Joint Board is now further unanimously agreed that chapter 551 of the Acts of 1908 should be amended by extending the time within which the consolidation may be authorized by the stockholders of the two companies. The following amendment would be suitable for such purpose: "The time within which the purchase and sale authorized by chapter five hundred and fifty-one of the acts of the year nineteen hundred and eight may be effected is hereby extended to December thirtieth, nineteen hundred and eleven."

While the Joint Board is thus unanimously agreed as to the great importance of this consolidation, its members find themselves unable to agree as to the rate at which the dividend upon the second preferred stock of the Boston Elevated Railway Company should be fixed. This report is therefore signed by all the members of the Board, and the question of such dividend rate is discussed in the majority and minority reports appended hereto.

WALTER PERLEY HALL, *Chairman*,
GEORGE W. BISHOP,
CLINTON WHITE,
Board of Railroad Commissioners.

GEORGE G. CROCKER,
GEORGE F. SWAIN, *Secretary*,
HORACE G. ALLEN,
JOSIAH QUINCY,
JAMES B. NOYES,
Boston Transit Commission.

JAN. 14, 1911.

Majority Report.

The third matter referred to the Joint Board by chapter 139 is whether or not in its opinion it is "advisable, expedient, and in the public interest":—

To provide for further modifications of chapter five hundred and fifty-one of the acts of the year nineteen hundred and eight, or to provide by any other method, and if so, by what method, for continuing the advantages of a single control of the systems of the Boston Elevated Railway Company and the West End Street Railway Company.

The fundamental question whether it is "advisable, expedient, and in the public interest" that the single control of these two systems should be assured for the future by the method of consolidation is answered in the affirmative in the unanimous report of the Joint Board above submitted. The majority of the Joint Board now proceeds to give its views as to the advisability of so modifying the terms of consolidation contained in the above-named act as to bring about the speedy unification of these two companies by voluntary agreement.

St. 1908, c. 551, authorized the consolidation of the West End Street Railway Company and the Boston Elevated Railway Company, and the exchange of the first preferred stock of the West End Street Railway Company for first preferred stock of the Boston Elevated Railway Company, bearing cumulative interest at the rate of 8 per cent. per annum, and the exchange of common stock of the West End Street Railway Company for second preferred stock of the Boston Elevated Railway Company, bearing cumulative interest at the rate of 7 per cent. per annum.

By chapter 85 of the Resolves of 1909 this Joint Board was asked to report upon the more specific question, whether or not it is "advisable, expedient, and in the public interest":—

First. To amend chapter five hundred and fifty-one of the acts of the year nineteen hundred and eight by providing for a distribution of any of the assets of the West End Street Railway Company among its stockholders, or by changing the terms and conditions of the first and second preferred stock to be issued by the Boston Elevated Railway Company, and, if so, in what manner and to what extent.

In dealing with the question now presented, it seems proper, in the first place, to distinguish, first, between the circumstances existing when the Joint Board made its report of last year (printed as Senate Document, No. 22, of 1910) and those existing at the date of the present report; and second, between the terms of the two references.

(1) The advantages, indeed the imperative necessity, of consolidation become more and more evident the more the question of future transportation facilities is studied.

Other questions closely related to consolidation, such as extensions of existing leases of subways and tunnels and the building of important and costly additional subways, had not at the date of the report referred to reached a stage where they seemed to be ripe for speedy settlement by legislative action.

The question of securing much-needed extensions of the underground rapid transit system, calling for an additional investment of about $10,000,000, which is dealt with in another report made to the Legislature by the Joint Board, seems to be closely connected from the standpoint of financial feasibility with the question of extending existing subway leases, dealt with in the second report; and both these questions are inextricably involved with the question of securing a consolidation of the two companies. However unlikely it may be that the existing single control of these two great transportation systems will ever be replaced by separate operation, the management of the Boston Elevated Railway Company would not seem to be warranted in assuming that any status will exist at the termination of the lease other than that provided for by the lease itself; it would therefore appear absolutely necessary for that company to provide long in advance both for meeting the obligations of the lease, and for continuing proper facilities for public travel on its own lines after the expiration of the lease. The development of the transportation system of Boston has reached a stage where the consolidation of the two companies seems an essential condition precedent to the securing of the further important extensions necessary to round out a measurably adequate and complete system.

These advantages are manifest not only to the Joint Board but to the Boston Elevated Railway Company, and are well set forth in the statement made to this Joint Board by its president, Gen. W. A. Bancroft, on Nov. 1, 1910, an extract from which is given in Appendix D.

(2) The Boston Elevated Railway Company, the lessee, which is seeking the consolidation of the two companies, had not last year publicly taken the position that it deemed consolidation of such urgent importance that it was willing to concede the payment of an 8 per cent. dividend upon its new second preferred stock in order to secure it, and that the cost of the increase of 1 per cent. would be much more than offset by the operating economies which could be effected. The position which the company has now taken on this matter, as set forth by its president, General Bancroft, at a public hearing before the Joint Board on Nov. 1, 1910, is stated as follows:—

"The change of the rate of dividend on the second preferred stock from 7 to 8 per cent. means an additional charge of $125,000 a year. The unnecessary expenditures of capital and the unnecessary expense of operation, if no consolidation is effected, ought in the near future to more than offset this annual payment; and the additional capital from time to time required by the company should be obtained on more favorable terms, if this question of consolidation is settled.

"The Elevated has no desire to pay more for the West End than it has to. It is a plain business proposition. The Elevated believes that it is much better to take over the West End property on an 8 per cent. basis for the second preferred stock than to further delay consolidation. If it is a good proposition for the Elevated, it is equally so for the public. The question is *not* what the purchasers, or the public, who stand in very much the same shoes as the purchasers, think the West End ought to do. The question is, what is best to be done.

"The West End stockholders are sincere in their belief that they are fairly entitled to 8 per cent. There is no evidence or suggestion that they are using their position to obtain anything which they believe to be unreasonable, nor can it be said that what they claim is unreasonable, from their point of view. . . .

"Further, in the case of this company no interest or dividends are being paid upon any franchise value or upon anything but actual cash invested in the property, which fact has an important bearing upon the reasonableness of any rate which is proposed.

"The whole question is, whether it is better for the public that a consolidation should now be authorized on the basis of 8 per cent. for the common stock of the West End Railroad Company, or whether the whole matter should be indefinitely postponed. There is no other alternative, and we believe that there can be but one answer to the question."

This statement by the president of the Boston Elevated Railway Company, conceding the claim of the holders of common stock of the West End Street Railway Company that they should receive 8 per cent., and avowing the willingness of the Boston Elevated Railway Company to pay this rate, definitely removes, in our opinion, the likelihood of an acceptance by these stockholders of the 7 per cent. rate.

(3) The question of raising the dividend rate to be paid under the consolidation to West End common-stockholders from 7 per cent. to 8 per cent. was last year involved with the demand of these stockholders for the distribution of so-called free assets of that company, which demand the Joint Board then pronounced an inadmissible one; whereas this demand has now been waived, so that nothing but the question of the extra 1 per cent. dividend seems to stand in the way of speedy consolidation.

(4) The time limit, expiring Dec. 31, 1910, within which the West End stockholders had the right to assent to consolidation under the terms of chapter 551 of the Acts of 1908, had not a year ago run out; therefore it did not then appear, in spite of the attitude taken by these stockholders at their meeting on April 14, 1909, that they might not during the year 1910 conclude to acquiesce in the terms of consolidation as fixed by that act.

It may also be added that the subject of the average rate of return which a 7 per cent. dividend would yield upon the capital invested in West End common stock, including the capital invested in the payment of premiums above par, as fixed at various times by the Board of Railroad Commissioners, was not fully gone into by the Joint Board last year or included in its report; and the recent issue of $1,390,000 additional West End common stock, authorized Sept. 15, 1910, at $75 a share, 50 per cent. above its par value, slightly further reduces this average rate of return. Full information on this important feature of the situation is set forth below. These figures make it evident that the rate of dividend to be paid on the second preferred stock of the Boston Elevated Railway Company affords no fair measure of the real return upon capital invested in West End common stock.

The only question involved alike in the similar reference of last year and in the terms of the present reference, above quoted, is, whether it is "advisable, expedient, and in the public interest" to change the terms of chapter 551, St. 1908, by allowing the common stock of the West End Street Railway Company to be exchanged for second preferred stock of the Boston Elevated Railway Company bearing 8 per cent. interest, instead of 7 per cent.

This Joint Board was not appointed to sit as a quasi-judicial body, or as a board of arbitration, to determine, either as between the West End

stockholders and the Elevated Railway stockholders, or as between the former and the public, whether the dividend rate in question should, as a matter of financial justice, be fixed at 7 per cent. or at some other figure. The Joint Board was merely authorized and requested, in substance, to advise the Legislature of 1910 whether it was expedient for that body, at that time, to amend the act of 1908 by raising the dividend rate on the Boston Elevated Railway Company second preferred stock above 7 per cent. as fixed therein. We still think that the Joint Board gave the Legislature sound advice in reporting, on Jan. 10, 1910, against the expediency of making such an amendment of the law of 1908 before it finally appeared that the West End stockholders would not within the time limit, which did not expire for another year, consent to the consolidation on the terms contained in that law. The opinion which the Joint Board then pronounced as to the justice of the 7 per cent. rate rather than a higher rate went beyond the terms of the legislative reference and beyond the requirements of a report against then amending the law of 1908.

Obviously, the public interest did not then, nor does it now, require that one dollar of preferred dividends should be conceded to the West End stockholders beyond the amount required to secure their consent to the consolidation. Undoubtedly the public interest, including the interest of the public in electric transportation in the metropolitan district, is more promoted by a low than by a high preferred dividend rate upon capital already invested, provided the rate is not so low as to discourage further similar investments of capital; for the lower the preferred dividend, the larger are the receipts which remain for the payment of dividends upon the common stock of the Boston Elevated Railway Company, in which the public has an interest contingent upon the declaration of dividends in excess of 6 per cent., and for the extension and improvement of service. It was, therefore, clearly expedient for the Joint Board sitting on the matter in 1909, and for the Legislature of 1910, to concede nothing which did not have to be yielded to achieve the result of making consolidation possible. In short, a trading situation then existed, and it would have been foolish for those who represented the public interests involved in the proposed trade between the two companies to have conceded the important point of an 8 per cent. dividend prematurely or unnecessarily. Unfortunately, neither the conclusion of the Joint Board nor the opinion pronounced by it on the justice of the 7 per cent. dividend rate led to an acceptance by the West End stockholders of the terms of the act of 1908.

Coming now to the terms of the two resolves of 1909 and of 1910, the Joint Board is asked to report upon questions far broader than those included within the limited terms of the reference of 1909. It is a fact of much significance that the resolve of 1910 includes the new and far-reaching question of the advisability of extending existing subway and tunnel leases with the narrower question of amending the terms of the act of 1908. This important addition to the field of inquiry of the Joint Board is of the greater significance because of the obvious fact, of which the Legislature was certainly aware, that, owing to the provisions of the present lease of the West End Street Railway Company by the Boston Elevated Railway Company, this new question of extending these leases is inextricably involved, as pointed out in General Bancroft's statement on November 1, with the question of securing a consolidation of the two companies. The question of extending existing leases, indeed, must assume consolidation as a condition precedent; while the question of terms reported upon last year is only one phase of this broad question. Whatever room there may be for a difference of views as to the rate of dividend which should be paid on the new second preferred stock of the Boston Elevated Railway Company, we believe that there is no room for a difference of opinion as to the economy and advantage to the public of securing the benefits of this consolidation, even at the expense of making this dividend rate 8 per cent., if necessary.

The formal declaration of the Boston Elevated Railway Company, above referred to, agreeing to the 8 per cent. dividend rate, if permitted by law, is of great importance, made, as it was, after full opportunity to

consider the terms and the effect of the report made by this Joint Board under the resolve of 1909, and also, it must be presumed, subsequent to careful consideration of the prospects of securing a voluntary acceptance of the 7 per cent. rate by the West End stockholders. The attitude of the lessee corporation, which will have to pay the additional annual preferred charge of $125,000 if the 8 per cent. rate is conceded, is not indeed conclusive as to the requirements of public policy; but its willingness to take the responsibility of placing this additional charge ahead of the dividends of its own stockholders, whose investments in the company have now reached the aggregate sum of $17,970,000, is very strong evidence that from a financial standpoint the advantages of securing speedy consolidation on an 8 per cent. dividend basis outweigh the chances of finally saving the extra 1 per cent. by carrying through the consolidation on a 7 per cent. basis.

It is unquestionably the duty of the directors of the Boston Elevated Railway Company to secure this consolidation, so important to the interest alike of their corporation and of the public, upon the cheapest terms which seem obtainable. But it is equally their duty to take a large rather than a small view of the whole transportation situation, and to look ahead to the future rather than to confine their view to the immediate present. They must consider, among other things, the pressing needs of the public, set forth in other reports of this Joint Board to the Legislature, for additional rapid-transit accommodations. If the directors, acting as trustees of the interests of stockholders, also acting under the obligations to which they are subject as to safeguarding the rights of the public in respect to necessary extensions of service, deliberately recommend acceptance of the 8 per cent. rate, the case against it should be a very strong one, from a public standpoint, in order to warrant the Legislature in denying to these two companies the right to consolidate upon the dividend basis upon which they are both ready to agree.

An assumption that an additional annual charge of $125,000 must necessarily diminish the ability of the Boston Elevated Railway Company to serve the public would be based upon a very superficial view of the matter. If the payment of this sum will within a few years result in economies several times as great in amount, if it will establish a basis of unified ownership which will greatly assist the raising of the many millions of new capital urgently required for extension of rapid transit facilities, then it would be a penny-wise and pound-foolish policy, both on the part of the corporation and of the public, to consider merely the immediate gross additional expenditure, rather than the future net economy. Large public-service corporations are frequently adding to their annual charges much larger burdens than the amount involved in this question, in the belief that the net result will strengthen their ability both to earn dividends for their stockholders and to perform their obligations to the public. The difference between 7 per cent. and 8 per cent. in this case is only equivalent to the amount which would be required to cover the 6 per cent. dividend rate on $2,000,000 of additional common stock of the Boston Elevated Railway Company. We believe that no investment of this amount has been, or could be, made by that company the returns upon which would be comparable to those which it would realize, directly or indirectly, through consolidation.

This argument is not intended to be carried to the point of suggesting that the Legislature should authorize the payment of a grossly unfair and excessive rate of return to the stockholders of a public-service corporation, in order that a needed consolidation may presently be effected. We do not believe that common-stockholders of the West End Street Railway Company have placed themselves in the position of demanding such terms. We think, on the contrary, that they honestly believe in the justice of their claim to receive 8 per cent. under the proposed consolidation. We further believe that it is not inconsistent with the position taken by this Joint Board in its report of last year to concede that the equities of this case, as between the public and these stockholders, are at least not so clearly and conclusively in favor of the 7 per cent. rate as to warrant the Legislature in determining that this rate must somehow be forced upon

reluctant stockholders, desiring no change in their present status as lessors under a lease which still has eleven years to run. We certainly do not believe that a policy of coercion ought to be adopted by this State in a case so much open to argument as the present one; but if voluntary consolidation, upon the terms now agreed upon by the two companies, is not to be permitted, we know of no way to bring about the desired end other than some form of coercion.

Some argument can, to be sure, be made that, everything considered, the position of the West End common-stockholders will be more advantageous with a 7 per cent. second preferred stock under the proposed consolidation than it will be if they take the chances of independent operation of their system, which is legally possible at the expiration of the lease. But, unfortunately, some terms of the lease seem to place them in a position of superior advantage when it runs out; and any conclusion must, after all, remain a matter of opinion, as a conclusive demonstration one way or the other is impossible. At any rate, the present question is not one of morals or of principle, but purely one of expediency or of bargaining.

The provisions above referred to in the lease of the West End Street Railway Company to the Boston Elevated Railway Company, defining the rights of the lessor in respect to extensions of leases and new leases of subways, are set forth for reference in Appendix E.

On the other hand, there are strong considerations in favor of the 8 per cent. rate, chief among which are the following:—

1. Whatever may be the situation after 1922, the security which the common-stockholders of the West End Street Railway Company will receive, in exchange for their present stock, is not as good a security as they now hold under the lease.

2. There is no doubt that the Boston Elevated Railway Company will always be willing to renew the lease of the West End Street Railway Company upon terms as favorable as those contained in the present lease, so that it would seem that a return of at least 7 per cent. could be counted on as a practical certainty.

3. It is not a question of receiving 7 or 8 per cent. upon the investment, inasmuch as the cash paid in for West End common stock has been much above the par value.

With reference to the first of these points: According to the existing lease of the West End Street Railway Company, the obligation to pay 7 per cent. on the common stock is an obligation which, as a practical matter, comes ahead of all other capital obligations of the Boston Elevated Railway Company,— ahead of the bonds as well as of the stock, because the payment of this rental is necessary to preserve the integrity of the entire system. If this West End common stock is exchanged for second preferred stock of the Boston Elevated Railway Company, the payment of dividends on such stock will come ahead only of the dividends on the common stock of the Boston Elevated Railway Company. It will have ahead of it the bonds of the Boston Elevated Railway Company. It is true that in all probability the interest on the new second preferred stock will be secure; nevertheless, the security is not quite as good as under the present lease.

With reference to the second point: The West End Street Railway is the heart of the Boston Elevated Railway system. It provides the greater portion of the short-distance traffic, and this is the paying traffic, which enables the Boston Elevated Railway Company to carry its other passengers for long distances for a 5-cent fare. Without this short-distance traffic, it is not improbable that fares would have to be increased over some of the present routes. There is no question, therefore, that the Boston Elevated Railway Company will always be ready to continue to lease the West End Street Railway Company on the present terms. It could not afford, in its own interest, to allow the control of the West End Street Railway Company to escape from its hands.

If any further proof of this position is needed, it is furnished by the fact that the lease agreed upon by the West End Street Railway Company and the Boston Elevated Railway Company in 1897, which, as required by law, was submitted to the Board of Railroad Commissioners and modified to

meet the views of that Board, provided that the term should be for ninety-nine years, and that the rate of interest on the West End common stock should be 8 per cent. If the Boston Elevated Railway Company was willing, in 1897, to lease the West End Street Railway Company for ninety-nine years and pay 8 per cent. on the common stock, it may be considered certain that it would be willing to extend the present lease indefinitely at 7 per cent.

With reference to the third point: It must be kept in mind that this is not a question between receiving 7 per cent. or 8 per cent. on an investment, inasmuch as the cash paid by the common-stockholders of the West End Street Railway Company for their stock has been far in excess of its par value. As a matter of fact, the sales of common stock of the West End Street Railway Company from the beginning have been as follows:—

DATE AUTHORIZED.	Date sold.	How sold.	Par Value.	Amount realized.
Articles of association,	Sept. 22, 1886,	Subscription, .	$80,000	$80,000 00
Sept. 7, 1887, . . .	Nov. 9, 1887,	Subscription, .	464,000	464,000 00
Jan. 24, 1889, . . .	March, 1889,	Subscription, .	956,000	956,000 00
Aug. 22, 1889, . . .	October, 1889,	Subscription, .	4,000,000	4,000,000 00
June 19, 1891, . . .	August, 1891,	Subscription, .	1,650,000	1,650,000 00
June 19, 1891, . . .	May 2-24, 1892,	Auction, . .	1,935,000	2,855,906 25
March 19, 1903, . .	May, 1903,	Subscription, .	376,800	678,240 00
March 19, 1903, . .	June 24, 1903,	Auction, . .	77,450	136,537 25
July 27, 1904, . . .	Aug. 24, 1904,	Auction, . .	150,000	274,575 00
March 30, 1907, . .	May 17-22, 1907,	Subscription, .	363,500	617,950 00
March 30, 1907, . .	June 21, 1907,	Auction, . .	56,500	92,697 50
Dec. 20, 1907, . .	January, 1908,	Subscription, .	935,450	1,309,630 00
Dec. 20, 1907, . .	February, 1908,	Auction, . .	75,450	121,851 75
Sept. 15, 1910, . .	Oct. 15, 1910,	Subscription, .	1,337,550	2,006,325 00
Sept. 15, 1910, . .	Dec. 14, 1910,	Auction, . .	52,450	94,060 37
Totals, . . .	. . . . .	. . . . .	$12,510,150	$15,337,773 12

As shown above, the total par value of West End Street Railway Company common stock authorized and issued to date is $12,510,150, while the total price paid by subscribers to all issues is $15,337,773.12; thus $2,827,623 has been paid in premiums in excess of par. This makes an average price of $61.30 paid per share, the par value being $50. For purposes of comparison, it is interesting to note that sales of Elevated Railway common stock have been made at the following figures:—

Par Value.	Price.	Amount paid.
$10,000,000	102.50	$10,250,000 00
3,300,000	155–155.12½	5,115,155 00
6,650,000	110–130.75	7,346,145 75
$19,950,000	113.84*	$22,711,300 75

* Average price.

From these figures it appears that the average price paid for West End common stock has been $61.30 per share (par value $50), while for all the stock sold since May 1, 1892, when stock was first required to be sold at a premium, and which includes nearly one-half the total, an average price has been paid of $76.38 per share. If 7 per cent. is paid upon this stock it nets the stockholders only 5.71 per cent. upon the average cost, and only 4.58 per cent. on the stock sold since stock has been sold at a premium. If 8 per cent. is paid, it nets only 6.52 per cent. on the average price, and 5.24 per cent. on the average price since stock has been sold at a premium. Considering that more than one-half of the stock has been sold at a premium and that the entire development of electric traction has taken place during the period that stock has been sold at a premium, it seems reasonable to consider this matter upon the basis of the return on this portion of the stock. From this point of view, therefore, the question is whether West End stockholders who have invested since June, 1891, are to receive 4.58 per cent., which the 7 per cent. dividend rate would yield, or 5.24 per cent., which the 8 per cent. dividend rate would yield, on their investment.

The figures for the Boston Elevated Railway Company show that, at the current rate of dividends, 6 per cent. on par, the return to the investors is 5.27 per cent. on the average price paid. That is to say, stockholders of the Boston Elevated Railway Company, receiving 6 per cent. dividends, obtain a trifle larger return on their average investment than investors in West End common stock since 1891 would receive if 8 per cent. on par value is fixed as the dividend rate on the second preferred stock; and the latter, if they consent to the desired consolidation, have no possibility of any increased return in the future, no matter how much may be the return on Elevated Railway stock.

It seems to the majority of the Joint Board not unreasonable that holders of common stock of the West End Street Railway Company, if they are to exchange their stock for a new security having less rather than greater rights of priority than that which they now hold, and feeling confident, as we think they have reason to feel, that their present advantageous position under the lease can be continued indefinitely, should insist that some consideration in excess of a 7 per cent. dividend should be given them in the exchange. We can see no reason to believe, particularly in view of the publicly expressed willingness of the lessee to pay 8 per cent., that they will accept less. They are not the movers in this matter. They are passive. They occupy a position which has been authorized and approved by the Commonwealth, through the Legislature and the Board of Railroad Commissioners. They claim to be satisfied with this position, and to have no desire to change it. They see their property increasing in value and earning power, and they feel sure that when the lease expires they can, if they desire, renew it on terms at least as favorable as those now fixed. It now appears that a change in their status would be an advantage both to the public and to the lessor, and would save a considerable sum of money annually. It seems to the majority of the Joint Board that the claim of these stockholders to be allowed some participation in these benefits is not an unreasonable one, unless this can be shown to be contrary to the established policy of the Commonwealth.

If any consolidation on the 7 per cent. basis is to be effected, it must, therefore, in our opinion, be brought about either (1) by direct legal compulsion, or (2) by some form of legislative coercion. Let us consider the merits of these alternatives.

We know of no method by which the Legislature can constitutionally compel the consolidation of these two companies except by taking all the property of both of them, paying the value thereof as judicially determined; we should then have both consolidation and public ownership, but at a staggering financial cost, which we doubt the willingness either of the Legislature or of the public to consider assuming at the present time. It may, however, be urged that this taking might be limited to the property of the West End Street Railway Company, if the Boston Elevated Railway Company were willing to purchase that system from the public,— which might well prove beyond the financial ability of that

company, if payment were required to be made in cash,— or to lease it for a long period, on such terms as would protect the public investment and also secure many of the advantages of consolidation. But this proceeding would be open to the obvious objections against using the power of taking the property of a corporation by right of eminent domain not because it is required for a public use, but because it is deemed desirable to transfer it to another corporation, which would like to secure it upon better terms than the present owners of the property are willing to concede. Moreover, the cost of taking the property of the West End Street Railway Company alone, representing a cash investment of $34,000,000, is an imposing one, even for the Commonwealth. Besides, the constitutionality of such a taking, made for the purpose of re-sale or lease to another corporation, — and this purpose might have to be avowed in the act,— would be doubtful; the question would probably be taken to the Supreme Court of the United States, perhaps with consequences which might prove disastrous while the appeal was pending. We therefore believe that the taking of the property of one or both of these companies need not be considered as a practicable alternative to voluntary consolidation.

There remains the alternative of legislation framed to coerce the West End Street Railway Company, by threat of destroying the value of its property, into accepting consolidation on the 7 per cent. dividend basis; this must be based upon the theory that the 7 per cent. rate is so clearly just to the West End stockholders as to warrant practically revoking their franchise if they decline to accept it.

We do not think that the reserved power of revoking street railway locations, without compensation, should be used for such a purpose. The Commonwealth cannot afford to threaten any action which it is not ready to put into effect; if the present situation calls for such a drastic course as suggested, the Commonwealth must be prepared to justify and execute it. The question is, whether the Legislature is warranted in revoking the locations of a street railway company which has leased its system to another company, not because of any failure to provide proper facilities for the public, but because its stockholders, when asked to substitute a present consolidation, involving great advantages to the public and the lessor, for a lease having still eleven years to run, ask for a small portion of the benefits to be derived. To say that no precedent can be found in Massachusetts for such a use of the power of revocation is to state the case too mildly; we do not believe that any one has even contemplated, heretofore, the use of this power for such a purpose. Such a proceeding would certainly strike a heavy blow at the confidence which affords the best foundation for the enormous investments which have been made in street railways in this Commonwealth, and which must still be made. It would be in effect giving notice to all investors in Massachusetts public-service corporations that their position would never be secure; that, even after they had accepted all conditions imposed by the Commonwealth, they would still be liable to be forced at any time into a different status, against their will, at the option of the Legislature. To do this would seem to the majority of the Joint Board a foolish and shortsighted policy.

It is not wholly a question as to whether the new status is a fair one to the stockholders; it is a question whether they should be coerced to make the change. It is a question whether the Commonwealth, having once fixed a status between two contracting parties, should attempt or threaten to change it against the will of one of the contracting parties. The Legislature can reasonably prevent consolidations, if it thinks they are against the public interest; it cannot reasonably compel them.

It would in one sense be an advantage if the stockholders of the West End Street Railway Company should be given, not even 7 per cent., but 6 per cent. or 5 per cent. or nothing. They cannot be criticised, however, and should not be threatened, if in any proposed change of status they insist upon what they believe is fairly due them. It is not altogether a question whether 7 per cent. is fair; it is a question whether the demand for 8 per cent. is unreasonable.

It remains to be considered, then, whether the increase in the rate of

interest to be allowed to the holders of the common stock of the West End Street Railway Company from 7 per cent. to 8 per cent. on its par value, or from 4.58 per cent. to 5.24 per cent. on the cash paid in since 1891, is against the established policy of the Commonwealth, and injurious to the public welfare.

The history of leases which have been approved by the Commonwealth, through its constituted authorities, discloses many cases in which a rate of return of over 7 per cent. on the par value, and of over 6.52 per cent. on the cash paid in, have been authorized.

Moreover, it may be said to be the policy of the Commonwealth to allow street railways to divide at least 8 per cent., if they can fairly earn it. St. 1906, c. 463, part III., provides as follows:—

B. Additional Corporate Franchise Tax.

SECTION 130. If an operating street railway company, including a company whose lines are located partly within and partly without the limits of the commonwealth, whether chartered or organized under the laws of this commonwealth or elsewhere, has paid during the year ending on the thirtieth day of September preceding the date of the return required by section one hundred and twenty-five dividends exceeding in the aggregate eight per cent. upon its capital stock, it shall for every such year, in addition to the tax required by section one hundred and twenty-eight, pay a tax equal to the amount of such excess to be determined as therein provided by the tax commissioner; but such additional tax shall not be imposed, if, from the date when the company commenced to operate its railway, it has not paid dividends equivalent in the aggregate to at least six per cent per annum upon its capital stock from year to year.

It would thus appear that a rate of return up to 8 per cent. is fixed by law as a rate which may be earned; and even a higher rate is not considered injurious to the public interest if it does not result from excessive charges for service, or from impairment of the property, provided the excess over 8 per cent. is divided with the State. The charges for service in Boston are not excessive. The capital of the West End Street Railway Company is not inflated. It has all been paid in cash, with a large premium over the par value. The road forms the nucleus of the street railway system in the largest city in New England.

The dividends paid upon West End common stock from the beginning have been as follows:—

1888,	5 per cent.*
1889,	10 per cent.
1890,	10 per cent.
1891,	10 per cent.
1892,	10 per cent.
1893,	9 per cent.
1894,	6 per cent.
1895,	6½ per cent.
1896,	7 per cent.
1897,	3½ per cent.†
1897,	4 per cent.‡

*Covering operations for a portion of the year. †In April. ‡In October.

At the end of 1892 there was outstanding common stock of a par value of $9,085,000, or about three-quarters of the present total.

It appears from the above figures that for the nine full years preceding the lease, 1889 to 1897, inclusive, the company paid an average dividend of 8.44 per cent. upon its common stock; for the last year the dividend was 7½ per cent., and the last dividend paid prior to the lease of the system in December, 1897, was at the rate of 8 per cent. per annum.

The years during which the dividend was reduced were a period of business prostration, and moreover electrical operation was then being introduced.

It seems reasonable to claim from these facts and figures that this property could earn 8 per cent. on the par value of its common stock.

The stock paid in while the road was being electrified was subscribed when the success of the enterprise was to a certain extent problematical, and the investment uncertain. It was not known whether electrical operation would be successful or economical. Indeed, the first system of electrical operation installed in Boston, that by the underground trolley system, was a failure, and had to be removed. There is much force in the declaration of General Bancroft: "Certainly 8 per cent. is not an unreasonable return upon the investment in an undertaking which was so hazardous as that of the West End at that time."

As for the capital subscribed later, it has been shown above that a dividend of 8 per cent. gives a return of only 5.24 per cent. on the total cash investment, including the premiums paid, subsequent to August, 1891.

There would seem, therefore, to be nothing in the established policy of the Commonwealth inconsistent with the payment of a dividend rate of 8 per cent. on the common stock of the West End Street Railway Company or on the new security to be substituted therefor.

After careful consideration of this question, therefore, the majority of the Joint Board feels compelled on this point to advise the Legislature that it is "advisable, expedient, and in the public interest" to authorize the dividend rate of 8 per cent. upon which the two companies have now agreed and announced their readiness to consolidate. The points in support of this conclusion may be thus briefly summarized: The great advantages which will be obtained from consolidation, and the saving in capital and operating expenses which will be secured; the urgent need for immediate consolidation, in order that the problem of metropolitan transit may be worked out properly and economically; the fact that the Boston Elevated Railway Company is willing to pay 8 per cent. on the second preferred stock; the fact that the West End stockholders are satisfied with their present status, and are unwilling to make the consolidation unless given some share of the benefits to be derived; the fact that the security for which West End common-stockholders would exchange their stock would not be quite as good a security as that which they give up; the fact that their present status may be fairly considered to be a permanent one; the fact that, if they are given only 7 per cent., those who have invested since 1891 will receive considerably less return on their investment than the Elevated Railway common-stockholders who have invested in a later period; the fact that West End common stock earned, in the nine years preceding the lease, an average rate in excess of 8 per cent. on its par value; the fact that the law of the Commonwealth specifically recognizes a dividend rate of 8 per cent. as not injurious to the public interest.

The majority of the Joint Board therefore recommends that St. 1908, c. 551, be amended by fixing the rate of interest on the proposed second preferred stock of the Boston Elevated Railway Company, for which the common stock of the West End Street Railway Company is to be exchanged, at 8 per cent. per annum on the par value, instead of 7 per cent.

GEORGE W. BISHOP.
CLINTON WHITE.
GEORGE F. SWAIN.
JOSIAH QUINCY.
JAMES B. NOYES.

Minority Report.

On so much of the third matter referred to the Joint Board by chapter 139 of the Resolves of 1910 as relates to the rate of cumulative dividend to be allowed on the second preferred stock of the Boston Elevated Rail-

way Company to be issued in exchange for common stock of the West End Street Railway Company in case of consolidation, the undersigned dissent from the report of the majority, and submit the following statement:—

A year ago this Joint Board, in response to a resolve of the Legislature of 1909, made a report to the Legislature of 1910, being Senate Document No. 22, that, in its opinion, it was not advisable, expedient, or in the public interest to permit the so-called free assets of the West End Street Railway Company to be distributed among its stockholders; and it further reported that, in its opinion, the second preferred stock of the Boston Elevated Railway Company to be issued in exchange for common stock of the West End Street Railway Company should not carry a rate of dividend higher than 7 per cent.

That portion of said report which relates to this matter is for convenient reference added as Appendix F.

It is claimed that there are new reasons for reaching a different conclusion as to the rate of dividend to be allowed on the second preferred stock.

The first is, that the stockholders, by their counsel, have now waived any claim for the distribution of the so-called free assets.

In relation to this it is sufficient to say that the fact that a person waives a claim to something to which he is not entitled is not a good reason for granting him something else.

The second reason given for urging a conclusion different from that expressed in the previous report is that on Oct. 15, 1910, new stock of the company was issued to the par value of $1,390,000, and that the price fixed by the Railroad Commissioners at which this stock could be issued was $75 per share, being 50 per cent. in advance of the par value. The total amount received by the corporation for the shares so issued was $2,085,000. It is urged that the issue of this stock at a premium enforces and strengthens the claim that the real question is not whether a 7 per cent. dividend would be a proper dividend on the par value of the stock, but whether such 7 per cent. dividend would be a proper return on the money actually paid into the treasury of the company; and it is stated that whereas the total issue of stock by the company to the present time amounts to $12,510,150, the amount actually paid into the treasury of the company, owing to issues of stock since 1891 having been made at a premium, amounts to $15,322,387.75; and that 8 per cent. on the par value of the stock amounts to only 6.5 per cent. upon the average cost of the stock to the public, while 7 per cent. nets only 5.7 per cent. on such average price; so that the true question is, whether those who have invested their money in the common stock of this company should receive on the average 6½ per cent. on their investment or only 5.7 per cent.

In the statutes no indication is found of a legislative intent to make the premiums received on issues of new stock the basis for changing the provisions of law affecting or affected by rates of dividend. It cannot be successfully claimed that the fact that new issues of stock have brought into the treasury of a corporation an amount of cash in excess of the par value of the stock gives to the holders of such stock a right to a dividend in excess of the rate allowed to stockholders who have paid only par for their stock; and it is still more unreasonable to claim that in consequence of such premiums higher rates of dividend should be allowed not only upon the stock so issued, but upon all stock of a corporation, whether issued at par or above.

It has been urged that under the lease the 7 per cent. dividend until 1922 has a rank in the obligations of the Boston Elevated Railway Company superior to that which the preferred cumulative stock of the Boston Elevated Railway Company would hold. Theoretically this is true. On the other hand, we think it clear that after 1922 the preferred 7 per cent. stock of the Boston Elevated Railway Company will be an investment of greater value than the common stock of the West End Street Railway Company will then have, if the company then begins anew to operate

as a separate company in competition with the Boston Elevated Railway Company. Any inferiority of security until 1922 will be much more than made up by the superiority of the investment from that time on.

Again, it is urged that the Boston Elevated Railway Company, in order to secure consolidation, is willing to undertake to pay 8 per cent. on the second preferred stock; and that this is in itself a sufficient reason why the rate should be raised to that figure. The fact is, however, that the Boston Elevated Railway Company is not entirely a free agent in this matter. Its hands are tied by virtue of the following provisions, among others, of the lease of the West End Street Railway Company, to wit: —

The Lessee, in anticipation of the expiration of said subway contract, shall use its best endeavors to agree with the City of Boston upon a new contract for a renewal or extension of the same upon the most favorable terms practicable, in which said new contract shall be embodied stipulations satisfactory to the Lessor, providing for the use and control of said subway by the Lessor upon the expiration or earlier termination of this lease.

All of the provisions of this lease applicable to said existing subway contract shall apply to any contract renewing or extending the same in the same manner and with the same effect as if said new contract had been in existence at the inception of this lease.

Extensions of said subway under the existing contract shall not be requested nor promoted by the Lessee except with the consent of the Lessor first had and obtained. In the event of any extension thereof under any other contract, or of the construction of any new subway, the use and control thereof if acquired by the Lessee shall be so acquired that upon the expiration or earlier termination of this lease, if such extension or new subway constitutes an essential part of the Lessor's surface system, the same shall belong to the Lessor; . . .

This lease was approved by the Board of Railroad Commissioners only as respects the rental or compensation to be paid, and the due and safe transportation of the public. That Board was, therefore, not responsible for assenting to any such provisions as those above quoted.

Under the agreement above set forth, it is not strange that the Boston Elevated Railway Company should feel obliged to express its willingness to undertake the burden of an 8 per cent. cumulative dividend.

The question is not what the Boston Elevated Railway Company may be willing to do in order to insure consolidation, but rather whether the interests of the public demand it; and, if so, what terms are fair alike to the stockholders of both companies and to the public.

It must be remembered that whatever rate of dividend is now allowed must in the future be paid without regard to the quality or the sufficiency of the service rendered by the corporation to the public. Since the lease was executed, thirteen years ago, credit for good management or blame for poor management has not rested with the West End Street Railway Company, but solely with the Boston Elevated Railway Company as lessee. After consolidation, the holders of the first preferred and the second preferred stocks will, to the extent of their holdings, become responsible for the service rendered to the public by the company; but whether that service is good or poor, cumulative dividends on such stocks at the rates which may now be fixed will have to be paid, because the passage of the act and its acceptance by the West End stockholders will create a binding contractual relation between them and the State. The payment of these cumulative dividends at the rate now to be fixed by the Legislature will forever be a fixed charge upon the resources of the Boston Elevated Railway Company, which the State, except with the consent of the holders of the stock, will be helpless to abate or modify in any way, no matter what may happen in the future.

In that portion of this report which meets with the approval of all the members of this Joint Board, the great desirability of a consolidation to secure more economical and better service is clearly set forth. About this

point there is no dispute. The only question is, whether the terms which are proposed for consolidation are fair to all parties in interest.

It is of the utmost importance that nothing should be done by the Legislature which will impair the confidence of the public that it and the municipalities will in all cases deal justly with those who have invested in our public-service securities. Adherence by the Legislature to the present 7 per cent. dividend rate, being the rate which has been paid since the execution of the lease, thirteen years ago, and the rate which, under the lease, will be paid for the remainder of the term, will, we feel sure, not impair such confidence; whereas, an increase to 8 per cent., amounting to the very considerable additional annual payment of $125,000, would be an unwarranted gift to the stockholders, which would to that extent impair the ability of the Boston Elevated Railway Company to serve the public properly.

In this connection it should not be overlooked that, as will appear in another report to be made by this Joint Board, the Boston Elevated Railway Company is urging that its leases of the Tremont Street subway, now running at 4⅞ per cent. on its cost, and the Washington Street tunnel, now running at 4½ per cent., may be extended at reduced rentals, for the very reason that continuance of the present rentals is too great a burden on its financial resources.

This $125,000 is equal to 1 per cent. of the combined cost of the Tremont Street subway and the Washington Street tunnel. It is but natural that the West End common-stockholders should be eager to have this large sum fall annually into their pockets, without any limitation as to time.

While the West End Street Railway Company has, as above shown, a large control over the actions of the Boston Elevated Railway Company, it is not in a position in which it can state that it will not do that which the Legislature deems essential to the proper exercise of its duties as a public-service corporation, and on terms which the Legislature deems to be just, both to the company and to the public. Its franchises, granted by the State, are subject to amendment or repeal; its locations in the streets are subject to revocation by the city of Boston, with the approval of the Board of Railroad Commissioners. So far as the State is concerned, the company is not in a position in which it can refuse to do what is right and what is needful, and the State must be the judge. It is the State and not the company which is in command.

It is a fact that another year has passed in which the stockholders of the West End Street Railway Company have failed to accept the act of 1908. It is but natural that they should desire to secure as high a rate of dividend as possible; but, in spite of the intimation that these stockholders will not agree to a consolidation on a 7 per cent. cumulative dividend basis for the common stock, we believe that they will not finally refuse to do that which the public welfare demands, upon terms which the Legislature, after full investigation, deems to be fair to them, and as liberal as a due regard to the interests of the public will permit. The history of the relations which have existed between the State and its public-service corporations confirms this belief.

Inasmuch as this consolidation is demanded by public considerations, and the terms which are offered to the stockholders of the West End Street Railway Company are believed to be not simply equitable, but liberal, it seems fitting that the provision in the act requiring a two-thirds vote for its acceptance should be changed to a provision requiring a majority vote, in order that there may be no chance that a majority of the stockholders may suffer owing to the refusal of a minority to do that which is right.

We recommend, therefore, that the act of 1908, chapter 551, as amended by St. 1909, c. 383, in addition to being amended as suggested in the report of last year, be also amended by changing the requirement of a two-thirds vote to a majority vote, and that the time allowed for its acceptance be extended to Dec. 31, 1911.

A draft of an act to accomplish these purposes is submitted as Appendix G.

In conclusion, the members of this Joint Board who join in this minority

report again declare their conviction that a rate of 7 per cent. on the second preferred common stock of the Boston Elevated Railway Company upon consolidation is the rate of dividend that should be fixed. The question presented cannot be held to resolve itself into one of trade or dicker. Certain common stockholders of the West End Street Railway Company contend, however, if we understand their position, that they will not assent to the consolidation unless the General Court declares that 7 per cent. is not in the public interest, and that 8 per cent. is in the public interest. With this position we have no sympathy whatsoever.

It amounts, upon re-statement, to a demand that this Joint Board assent to sacrificing the interests of the whole public to secure a consolidation which both companies and the public declare to be most desirable. If the General Court adopts the views of this minority, and the West End Street Railway Company fails to acquiesce in and abide by such determination, it will be in a position of declaring that in its opinion the public interest should be subordinated to its private interests.

WALTER PERLEY HALL.
GEORGE G. CROCKER.
HORACE G. ALLEN.

APPENDIX A.

AN ACT TO AUTHORIZE THE BOSTON ELEVATED RAILWAY COMPANY TO PURCHASE AND HOLD THE STOCKS AND BONDS OF, AND TO CONSOLIDATE WITH, CERTAIN OTHER STREET RAILWAY COMPANIES.

Be it enacted, etc., as follows:

SECTION 1. The Boston Elevated Railway Company, hereinafter called the company, subject to the approval of the board of railroad commissioners, hereinafter called the board, may from time to time acquire and hold the stocks and bonds of any other street railway company, except the West End Street Railway Company, incorporated under the laws of the commonwealth whose railway has a physical connection with any railway now owned, leased or operated by the company. The facilities for travel on the railways of each of said companies shall not thereby be diminished or the rates of fare increased. The company, subject to the approval of the board, and, except as herein provided, to the general laws now or hereafter in force, may issue its own stock or bonds to provide means for paying for stocks and bonds purchased as aforesaid; but the par value of the stock and bonds so issued by the company shall not exceed the par value of the stocks and bonds so purchased, and in no case shall the amount of bonds so issued exceed the amount of bonds so purchased. The railway companies whose stocks are owned in whole or in part by the company shall not by reason of such ownership be deemed to be owned, leased or operated by the company within the meaning of chapter five hundred of the acts of the year eighteen hundred and ninety-seven: *provided, however,* that if the company shall acquire the stock of any street railway company whose entire railway is leased or operated by it at the date of the passage of this act, the gross receipts of such street railway company so leased or operated shall thereafter continue to be included in the gross receipts referred to in section seventeen of said chapter five hundred of the acts of the year eighteen hundred and ninety-seven in determining the rental to be paid by the company to the city for the use of the East Boston tunnel. Nothing herein contained shall be deemed to authorize the company to acquire the stocks or bonds of any street railway company organized after January one, nineteen hundred and eleven, whose railway may hereafter be constructed in any city or town in which the company now owns, leases or operates a street railway.

SECTION 2. Whenever the company acquires thirty-five per cent of the stock of any street railway company, it shall upon the conditions and in the manner herein provided purchase the remaining stock of such street railway company. Immediately upon the acquisition of such percentage of stock it shall cause to be sent by mail to each stockholder of record of such street railway company at his last known post office address a notice that it has acquired such percentage, and will purchase all or such portion of the remaining stock as may be tendered to it within six months thereafter, at a price per share equal to the average price paid by it for such thirty-five per cent of the stock, and this price, as determined by the board, shall be named in the notice.

SECTION 3. The stock or bonds of other street railway companies acquired by the company under the provisions of this act shall not thereafter be sold or otherwise disposed of, absolutely or conditionally, except with the consent of the board; but this provision shall not be construed so as to impair the rights of creditors of the company to secure payment of any indebtedness due them.

SECTION 4. No contract relating to joint traffic or to the sale of power between the company and any other street railway company of the capital stock of which it owns any shares shall be valid until approved by the board.

SECTION 5. The provisions of section ten of chapter five hundred of the acts of the year eighteen hundred and ninety-seven relating to tolls or fares shall be extended to include within a distance of five and one-half miles from the state house the road of any street railway company thirty-five per cent of the stock of which the company shall acquire under the provisions of this act; but this shall not be construed as limiting or otherwise affecting the provisions of said section so far as they relate to tolls or fares for passengers upon roads owned, leased or operated by the company at the time of the passage of this act.

SECTION 6. In determining the amount of tax to be paid by the Boston Elevated Railway Company upon the corporate franchise, there shall be deducted from the fair cash value of all of its shares, in addition to the other deductions provided for by statute, the fair cash value, as determined by the tax commissioner, of the shares of any other street railway organized under the laws of the commonwealth which may be owned by the Boston Elevated Railway Company.

SECTION 7. Whenever the Boston Elevated Railway Company shall acquire a majority of the capital stock of any other street railway company under the provisions of this act, it shall proceed within ninety days thereafter to take the steps necessary to consolidate such company with itself under any general laws then or thereafter in force providing for the consolidation of street railway companies. The compensation tax, so called, provided for by section ten of chapter five hundred of the acts of the year eighteen hundred and ninety-seven shall not apply to the gross earnings derived from any street railway lines not owned, leased or operated by the Boston Elevated Railway Company on the first day of January in the year nineteen hundred and eleven which said company shall acquire by consolidation; but the commutation tax, so called, imposed upon street railways by part III. of chapter four hundred and sixty-three of the acts of the year nineteen hundred and six, or any excise tax in substitution therefor which may at any time be imposed by general law upon the gross receipts or earnings of street railway companies, shall apply to the gross receipts derived from such lines in the same manner as if the same had not been consolidated. Such commutation tax shall be assessed in the different cities and towns as may be provided by general law, and the Boston Elevated Railway Company shall pay the same. After the tenth day of June in the year nineteen hundred and twenty-two

the Boston Elevated Railway Company shall be subject to all general laws relative to the taxation of street railway companies, and the same shall apply to all lines owned, leased or operated by it. For the purpose of effecting any consolidation as above provided, the vote of a majority in interest of the stockholders of each of the contracting corporations shall be sufficient, but such consolidation shall not be valid and binding until its terms have been approved by the Board of Railroad Commissioners. The authority granted in this act to the Boston Elevated Railway Company to acquire stocks and bonds of other street railway companies shall terminate on the tenth day of June in the year nineteen hundred and twenty-two; and not later than the first day of January in the year nineteen hundred and twenty-four said company shall dispose of any stocks or bonds of any street railway company acquired by it under the provisions of this act, and shall have no authority to hold the same thereafter.

SECTION 8. Upon petition of a city or town within which are the tracks of the company, of any street railway company owned, leased or operated by it, or of any street railway company stock or bonds of which are acquired by the company under the provisions of this act, or upon petition of any other party in interest, the supreme judicial or the superior court may by appropriate process enforce the provisions of this act or prevent violation thereof.

SECTION 9. This act shall take effect upon its acceptance by the company, by vote of its board of directors and return thereof to the secretary of the commonwealth, within six months after its passage.

APPENDIX B.

AN ACT IN RELATION TO LEASES OF SUBWAYS AND TUNNELS WITHIN THE CITY OF BOSTON.

Be it enacted, etc., as follows:

SECTION 1. The extension of the existing leases of the Tremont street subway, of the East Boston tunnel, and of the Washington street tunnel, provided for in this and the following sections, shall only take effect subject to all of the conditions set forth in the last section of this act. The Tremont street subway, so called, shall be leased to the Boston Elevated Railway Company for a term commencing upon the expiration of the present contract for the use of said subway and ending on the first day of July, nineteen hundred and thirty-six, upon the same terms and conditions stated in said existing contract except as herein otherwise specified. The rental from and after the expiration of the present contract shall be a sum equal to four and one half per cent per annum on the net cost of said Tremont street subway.

SECTION 2. The lease of the East Boston tunnel to the Boston Elevated Railway Company shall be extended from the tenth day of June, nineteen hundred and twenty-two, until the first day of July, nineteen hundred and thirty-six, upon the same terms and conditions contained in the existing lease, except as herein otherwise expressly specified. The rental from and after the tenth day of June, nineteen hundred and twenty-two, shall be a sum equal to four and one half per cent per annum on the net cost of the tunnel. The provision for the collection of tolls from passengers using the tunnel shall be eliminated from such extension.

SECTION 3. The lease of the Washington street tunnel to the Boston Elevated Railway Company shall be extended from the expiration of the present lease, on the thirtieth day of November, nineteen

hundred and thirty-three, until the first day of July, nineteen hundred and thirty-six, such extension to be upon the same terms and conditions as are contained in the present lease, except as herein otherwise specified. The rental during such extension shall be at the rate of four and one half per cent per annum upon the net cost of the tunnel.

SECTION 4. The lease to be made to the Boston Elevated Railway Company of the Beacon Hill tunnel under the provisions of section twenty-three of chapter five hundred and twenty of the acts of the year nineteen hundred and six, shall be for a term ending on the first day of July, nineteen hundred and thirty-six. The rental for a period of twenty years from the opening for use of said tunnel shall be four and seven eighths per cent annually upon the net cost of the tunnel, and thereafter until the first day of July, nineteen hundred and thirty-six, shall be at the rate of four and one half per cent per annum upon its net cost.

SECTION 5. The lease of the Riverbank subway to the Boston Elevated Railway Company to be made under the provisions of section ten of chapter five hundred and seventy-three of the acts of the year nineteen hundred and seven, shall be for a term ending on the first day of July, nineteen hundred and thirty-six, and the rental shall be at the rate of four and one half per cent per annum upon the net cost of the subway.

In case an act or acts shall be passed authorizing the construction of a tunnel from Park street to a point at or near Andrew square in the city of Boston, and the same shall be leased to the Boston Elevated Railway Company, as provided in the last section of this act, such lease or leases shall be for a term ending on the first day of July, nineteen hundred and thirty-six, and the rental shall be at the rate of four and one half per cent per annum upon the net cost of such tunnel.

So much of section thirteen of chapter five hundred and seventy three of the acts of the year nineteen hundred and seven as provides that "all rents, tolls, percentages or other annual compensation received by the city for any use of the subway under this act, shall annually be used by the treasurer, first, to meet the requirements of any deficiency in the sinking fund; second, to meet the interest on the bonds; and the surplus, if any, as a part of the general revenue of the city" is hereby repealed.

SECTION 6. The words "consolidated transit loan" as used in this act shall mean the bonds which have now been, or may hereafter be, issued by the city of Boston to pay for the construction of the Tremont street subway, the East Boston tunnel, the Washington street tunnel, the Beacon Hill tunnel, the Riverbank subway, and the proposed tunnel from Park street to a point at or near Andrew square, herein referred to.

Subject to the requirements of existing acts, the rentals of all of said subways and tunnels are hereby pledged to secure the payment of the principal and interest of the consolidated transit loan. All bonds hereafter issued by the city of Boston to provide for the construction of tunnels and subways shall be for such term of years not less than thirty years and not exceeding forty-five years as the city treasurer of said city with the approval of the mayor may fix: *provided, however,* that before the term of any of such bonds shall be fixed at less than forty-five years, the city treasurer shall file with the city clerk of said city a certificate that in his opinion the sinking funds provided for the retirement of the consolidated transit loan will be adequate to provide for the payment of such bonds at the maturity thereof.

SECTION 7. In order to provide for the abolition at the earliest possible date of the toll required of passengers using the East Boston tunnel, and in order to provide for the payment of the bonds issued for the Washington street tunnel, the rental received from the proposed

tunnel from Park street to a point at or near Andrew square, herein referred to, and from the Riverbank subway, over and above the amount required to pay the interest on the bonds issued therefor, and the rental received from the Tremont street subway over and above the amount required to meet the interest and sinking fund requirements of the bonds issued therefor, shall, in addition to the rental payable by the Boston Elevated Railway Company under the lease of the East Boston tunnel, be applied to meet the interest and sinking fund requirements of the bonds issued for the construction of the East Boston tunnel; and in so far as such rentals may not be required for that purpose they shall be applied, in addition to the rental payable for the Washington street tunnel, to meet the interest and sinking fund requirements of the bonds issued for the construction of said Washington street tunnel.

SECTION 8. The excess rentals of the East Boston tunnel, the Tremont street subway, the Washington street tunnel, the Riverbank subway, and the proposed tunnel from Park street to a point at or near Andrew square, herein referred to, not needed to provide for the interest and sinking fund requirements specified in the preceding section, and any rental of the Beacon Hill tunnel not needed to provide for the interest and sinking fund requirements of the bonds issued therefor, shall be applied so far as necessary to meet the interest and sinking fund requirements of the other bonds constituting the consolidated transit loan.

SECTION 9. If the city of Boston shall so elect, and shall notify the Boston Elevated Railway Company of such election in writing on or before the first day of January, nineteen hundred and thirty-five, such of the leases of the several subways and tunnels specified in section six as are held at the date of such notice by the Boston Elevated Railway Company shall be extended for the further term, and at the rate of rental, to be determined as hereinafter provided, without further action by either party; or the Boston Elevated Railway Company may so elect, and in such case shall so notify the city on or before said date, and in such case the aforesaid leases shall be extended as above provided, without further action by either party. In case either the city or the company shall so require and shall notify the other in writing within ten days of the date of the notice of election above provided for, the minimum term of such extension shall be such period, to be determined by a board of three arbitrators hereinafter provided for, as will, at an assumed rate of rental of four and one half per cent per annum, together with the rentals of any subways and tunnels specified in section six and not at the date of the aforesaid notice leased to the Boston Elevated Railway Company, provide, according to the estimate of such arbitrators, for the payment in full at maturity of all outstanding bonds constituting the consolidated transit loan herein provided for: *provided, however*, that the term of such extension shall not in any case exceed twenty-five years from the first day of July, nineteen hundred and thirty-six. The rentals payable by the Boston Elevated Railway Company from and after the first day of July, nineteen hundred and thirty-six, shall be at such rate as such arbitrators shall determine to be reasonable, due consideration being given to any changes in pertinent conditions since the passage of this act; *provided, further*, that if the arbitrators shall fail to fix such new rate of rental by the thirtieth day of June, nineteen hundred and thirty-six, then the Boston Elevated Railway Company shall continue to pay the annual rental then in force until such time as the new rate of rental shall be determined; and upon the determination of such new rate the difference between the old and the new rate shall be adjusted and paid between the parties. In fixing the term of such extensions, within the limits above provided for, and in fixing the rate of rental, the arbitrators shall so adjust both of the same that the rate of rental fixed will, within the term fixed, at least provide, as estimated by the arbitrators, for the payment at maturity of all bonds of such consolidated transit loan then outstanding.

SECTION 10. In case either the city of Boston or the Boston Elevated Railway Company shall give written notice to the other that it elects to have the lease extended as provided in section nine, it shall within ten days of such notice make application to the chief justice of the supreme judicial court, who shall, after due notice to the other party, appoint a board of three arbitrators. The arbitrators shall hear the parties and their counsel or any statements or evidence which the parties or either of them desire to submit, and may resort to any other sources of information in reference to the question submitted for determination. Within thirty days after such appointment, unless such time shall be extended for cause by written order of the arbitrators, they shall make their determination in writing in duplicate, one copy to be delivered to the Boston Elevated Railway Company and the other to the city of Boston. In case any vacancy shall at any time occur, by reason of the death, resignation or inability to serve of any arbitrator, his successor shall be appointed in the same manner as above provided for the original appointment of such arbitrator. Any determination by a majority of the arbitrators shall be final and conclusive. All fees and expenses of arbitrators shall be borne and paid equally by the city of Boston and the Boston Elevated Railway Company, by both of whom every such arbitrator shall be deemed to be employed.

SECTION 11. Within ninety days (1) after this act shall have been accepted by the mayor and the city council of the city of Boston as provided in section thirteen of this act, and (2) after a certificate that the consolidation referred to in said section thirteen has been filed with the secretary of the commonwealth, and (3) after a lease of the proposed tunnel from Park street to a point at or near Andrew square above referred to shall have been executed by the Boston Elevated Railway Company, as provided in said section thirteen, the Boston transit commission, acting on behalf of the city of Boston, and the Boston Elevated Railway Company, shall execute leases of the Beacon Hill tunnel and of the Riverbank subway, for the terms and upon the conditions hereinbefore prescribed, unless such leases have already been executed for the terms and upon the conditions as prescribed by law at the date of such execution, and in case such leases have already been so executed, shall execute alterations of the same, readjusting the terms and conditions thereof so as to conform to the terms and conditions prescribed in this act; and said commission and said company shall execute within said ninety days extensions of the existing leases of the Tremont street subway, of the East Boston tunnel, and of the Washington street tunnel, all for the terms and upon the conditions herein prescribed.

SECTION 12. The extension of the several tunnel and subway leases in accordance with the authority conferred by this act shall not in any respect impair any right which the city of Boston may at any time have to take the railway properties of the Boston Elevated Railway Company. In the event of such taking the compensation to be paid the company shall not be enhanced by reason of such extensions, nor shall it be diminished because of the fact that without such extensions the connection between different parts of said properties might be cut off.

SECTION 13. This act shall take effect upon its acceptance by the mayor and the city council of the city of Boston, and by the Boston Elevated Railway Company by vote of its board of directors and return thereof to the secretary of the commonwealth within six months from the date of its passage; but notwithstanding such acceptances, this act shall become null and void unless, within one year from the date of the passage hereof, (1) the properties of the West End Street Railway Company and of the Boston Elevated Railway Company shall be consolidated under the provisions of chapter five hundred and fifty-one

of the acts of the year nineteen hundred and eight, and of any amendment thereof, or under some other provision of law, and a certificate of such consolidation shall be filed with the secretary of the commonwealth; and unless (2) an act or acts shall be passed authorizing the construction of a tunnel from Park street to a point at or near Andrew square in the city of Boston; and unless (3) such last-named act or acts shall be accepted by the Boston Elevated Railway Company and a lease or leases of such tunnel duly executed by said company and by said city in accordance with the terms of this act.

APPENDIX C.

AN ACT IN RELATION TO LEASES OF SUBWAYS AND TUNNELS WITHIN THE CITY OF BOSTON.

Be it enacted, etc., as follows:

SECTION 1. Subject to the provisions of the last section of this act, contracts for the use of the Tremont street subway, the East Boston tunnel, and the Washington street tunnel shall be entered into by the city of Boston and the Boston Elevated Railway Company for terms beginning at the expiration of the existing contracts relating to such use and ending on the first day of July, nineteen hundred and fifty; and the rentals thereon, after the expiration of the existing contracts, shall be sums equal to four and three quarters per cent per annum on the net cost of such subway and tunnels respectfully. The other provisions of such contracts shall be similar to those in the existing contracts, excepting that the contract for the use of the East Boston tunnel shall be modified by omitting the provision for the collection of tolls from passengers using the tunnel.

SECTION 2. The contract for the use of the tunnel under Beacon Hill, known as the Cambridge connection, to be made with the Boston Elevated Railway Company under the provisions of section twenty-three of chapter five hundred and twenty of the acts of the year nineteen hundred and six, for a term of twenty years from the opening of said tunnel for use, at an annual rental equal to four and seven eighths per cent on the net cost of the tunnel, shall be extended beyond the said period of twenty years to the first day of July, nineteen hundred and fifty, the annual rental during such extension being at the rate of four and three quarters per cent upon the net cost of said tunnel.

SECTION 3. The contract for the use of the Riverbank subway to be made with the Boston Elevated Railway Company under the provisions of section ten of chapter five hundred and seventy-three of the acts of the year nineteen hundred and seven, which contract is to be for a term of twenty-five years from the opening of said subway for use, at an annual rental equal to four and one half per cent on the net cost of the subway, shall be extended beyond said period of twenty-five years to the first day of July, nineteen hundred and fifty, the annual rental during such extension being at the rate of four and three quarters per cent upon the net cost of said subway.

SECTION 4. The words "consolidated transit loan," as used in this act, shall mean the bonds which have now been, or may hereafter be, issued by the city of Boston to pay for the construction of the Tremont street subway, the East Boston tunnel, the Washington street tunnel, the Cambridge connection tunnel under Beacon Hill, the Riverbank subway, and the proposed tunnel from Park street to a point at or near Andrew square in South Boston.

Subject to the requirements of existing acts, the rentals of all of said subways and tunnels are hereby pledged to secure the payment of the principal and interest of the consolidated transit loan. All

bonds hereafter issued by the city of Boston to provide for the construction of the tunnels and subways above enumerated shall be for such term of years as the city treasurer of said city may determine, but the date fixed for the maturity of any such bonds shall not be later than the first day of July, nineteen hundred and fifty.

SECTION 5. In order to provide for the early abolition of the toll imposed by section seventeen of chapter five hundred of the acts of the year eighteen hundred and ninety-seven on persons using the East Boston tunnel, and in order to provide for the payment of the bonds issued for the Washington street tunnel, the rental received from the proposed tunnel from Park street to a point at or near Andrew square, and from the Riverbank subway, over and above the amount required to pay the interest on the bonds issued therefor, and the rental received from the Tremont street subway over and above the amount required to meet the interest and sinking fund requirements of the bonds issued therefor, shall, in addition to the rental payable by the Boston Elevated Railway Company under the lease of the East Boston tunnel, be applied to meet the interest and sinking fund requirements of the bonds issued for the construction of the East Boston tunnel; and in so far as such rentals may not be required for that purpose, they shall be applied in addition to the rental payable for the Washington street tunnel to meet the interest and sinking fund requirements of the bonds issued for the construction thereof.

SECTION 6. The excess rentals of the East Boston tunnel, the Tremont street subway, the Washington street tunnel, the Riverbank subway, and the proposed tunnel from Park street to a point at or near Andrew square, above referred to, not needed to provide for the interest and sinking fund requirements specified in the preceding section, and the rental of the Beacon Hill tunnel not needed to provide for the interest and sinking fund requirements of the bonds issued therefor, shall be applied so far as necessary to meet the interest and sinking fund requirements of the other bonds constituting the consolidated transit loan.

SECTION 7. The extension of the several tunnel and subway leases in accordance with the authority conferred by this act shall not in any respect impair any right which the city of Boston may at any time have to take the railway properties of the Boston Elevated Railway Company. In the event of such taking the compensation to be paid the company shall not be enhanced by reason of such extensions, nor shall it be diminished because of the fact that without such extensions the connection between different parts of said properties might be cut off.

SECTION 8. This act shall not take effect unless and until within one year from its passage, first, a consolidation of the West End Street Railway Company with and into the Boston Elevated Railway Company, under the provisions of chapter five hundred and fifty-one of the acts of the year nineteen hundred and eight, and acts in amendment thereof or in substitution therefor, is effected, and a certificate of such consolidation filed with the secretary of the commonwealth; second, an act is passed authorizing the construction of a tunnel from a point at or near the corner of Park and Tremont streets to a point at or near Andrew square in said Boston, and said tunnel is leased by the city of Boston to the Boston Elevated Railway Company for a term beginning with the opening of said tunnel for use and ending on said first day of July, nineteen hundred and fifty, at an annual rental equal to four and three quarters per cent on the net cost of such tunnel; third, this act is accepted and agreed to by the mayor and the city council of Boston, and by the Boston Elevated Railway Company acting by its board of directors, such action being evidenced by a certificate filed with the secretary of the commonwealth.

APPENDIX D.

EXTRACT, IN RELATION TO CONSOLIDATION, FROM STATEMENT BY PRESIDENT WILLIAM A. BANCROFT, BOSTON ELEVATED RAILWAY COMPANY, BEFORE THE JOINT BOARD, NOV. 1, 1910.

It is of the utmost importance to the community that this consolidation should be effected at once, and not postponed indefinitely, or until the expiration of the lease.

The lease comes to an end in eleven years. In an undertaking of this character for rapid transit in this community eleven years is but a short period. Plans and provisions must be made for many years ahead; and this cannot be done in the face of uncertainty as to the future, especially in view of the uncertainty as to whether or not the surface system is to be separated from the Elevated system at the expiration of this short period of eleven years.

The Washington Street tunnel was projected in 1902, and was not completed and ready for operation until the expiration of six years.

The Cambridge subway was projected in 1904, and finally authorized in its present form in 1906, and will not be ready for operation for another year or more, or from seven to eight years from the time it was planned. These facts show how impracticable it is for the Elevated to enter into undertakings for promoting rapid transit when the entire system may be disrupted in a little over eleven years.

The State recognizes the principle that one of the most important matters in connection with public-service corporations is to limit the amount of capital invested to the necessary requirements of the service. To secure this it is the duty of the Railroad Commissioners to supervise, in the case of transportation companies, the issue of capital, so that no unnecessary amount may be issued. It is also recognized as fundamental that the public-service corporation shall operate its property in the most economical manner, with due regard to the requirements of the public, and that all waste shall be avoided.

The cost of providing power for the operation of the Elevated and surface lines, both because of the capital invested and the cost of generating and distributing the power, is a large item in the expenditures of the company. Under the terms of the lease of the West End Company, the Elevated must return that company's property equipped and provided with its own power, so that it can be independently operated as a separate system. That means that the power supply at the expiration of the lease for each company must be separate and distinct.

It needs no argument to show that to provide the surface and Elevated systems, which interlace each other, with separate and distinct power would involve not only a wasteful expenditure of capital, but also a wasteful operating expense.

Messrs. Stone & Webster estimated in 1908 that, with the power requirements of the two systems increased to the extent which would be necessary in ten years, or in 1918, there would be an actual waste of $600,000 a year if the surface and Elevated lines were separately equipped with power plants and operated independently of each other, and that the amount would be still greater at the expiration of the lease, in 1922.

It may be suggested that the two systems could be operated as one until the expiration of the lease, and that there need be no waste until that time, and that the question of consolidation can be indefinitely postponed. On the contrary, unless a consolidation is effected at once, there is bound to be in the near future a waste in operation and a waste of capital expended on this account.

In the first place, it is obvious that the construction of power plants and the provision of necessary conductors and wires to transmit the power to different parts of the system is a matter of years to provide; and the Elevated cannot wait until the expiration of the lease to provide power

which will be required for the separate operation of the two systems. Further, in providing for additional power at the present time the company must know whether the two systems are to remain a unit, or whether they may be separated at the end of eleven years. This is illustrated by a question of large importance which is now concerning the management of the Elevated road. It has become necessary to provide at once an additional power plant of large capacity. For this purpose the company has purchased property in South Boston at tide water at a cost of something over $300,000, it being believed that by locating a station at tide water power can be more economically produced than if it is manufactured elsewhere. In order to produce the most economical results, it is found that this station should be what is called an alternating station, and that the current produced should be distributed through sub-stations over substantially the entire systems, and used for surface and Elevated lines indiscriminately. The construction of this power station, with its sub-stations and connections, will require an expenditure of nearly three and a half millions of dollars.

Now, the difficulty is this: if the West End system is hereafter separated from the Elevated system, a very considerable part of this expenditure will be wasted, because the West End under the lease must be furnished with its own independent system of power supply. The alternative of this development is to provide separate power plants for the surface lines and for the Elevated lines at a very considerable increase in capital expenditure and in operating expense.

Further, there are now before your Boards propositions for several subways to be built and leased by the Boston Elevated. It would at best take several years to complete these subways ready for operation. They will be either for surface cars or Elevated trains. At the expiration of the West End lease it is provided that those which constitute an essential part of the surface system shall become the property of the West End, and those that are part of the Elevated system shall belong to the Elevated.

It is not clear, however, how far the West End Company could be compelled to take over any of the subway leases against its will, especially as it may claim that they were not an essential part of its system as long as the company was left with a complete system of surface tracks, as required by the lease. The Elevated would then be left with subways for surface cars, without any surface cars to run in them; or with subways for Elevated trains, without any surface car connection.

In any event, these new subways are likely to be a serious loss for the first few years after they are constructed. The Elevated could hardly be expected to assume them during the short period prior to the expiration of the West End lease,— only to turn them over to the West End Company at the time when they might possibly begin to show a profit.

Demands for improved facilities in the transportation system in Boston have increased far beyond the increase in revenue, and the Elevated Company is in no position to assume new burdens, with the uncertainty existing as to the future of the surface lines, and in view of the unnecessary expenditures to which it will be put in the near future if such a consolidation is not provided.

APPENDIX E.

EXTRACT FROM LEASE OF WEST END STREET RAILWAY COMPANY TO THE BOSTON ELEVATED RAILWAY COMPANY, DEC. 9, 1897.

The Lessee [the Boston Elevated Railway Company], in anticipation of the expiration of said subway contract [the lease of the Tremont Street subway], shall use its best endeavors to agree with the city of Boston upon a new contract for a renewal or extension of the same upon the most favorable terms practicable, in which said new contract shall be embodied stipu-

lations satisfactory to the Lessor [the West End Street Railway Company], providing for the use and control of said subway by the Lessor upon the expiration or earlier termination of this lease.

All of the provisions of this lease applicable to said existing subway contract shall apply to any contract renewing or extending the same in the same manner and with the same effect as if said new contract had been in existence at the inception of this lease.

Extensions of said subway under the existing contract shall not be requested nor promoted by the Lessee except with the consent of the Lessor first had and obtained. In the event of any extension thereof under any other contract, or of the construction of any new subway, the use and control thereof if acquired by the Lessee shall be so acquired that upon the expiration or earlier termination of this lease, if such extension or new subway constitutes an essential part of the Lessor's surface system, the same shall belong to the Lessor; that if such extension or new subway constitute an essential part of the Lessee's system, the same shall belong to the Lessee; that if such extension or new subway be capable of concurrent use by both systems, provisions shall be made for such concurrent use by both Lessor and Lessee; and that if such extension or new subway constitute an essential part of both systems, but be incapable of concurrent use by both, the Arbitral Board provided for by Article XII. shall determine, in view of all the equities of the case and of all the private and public considerations involved, to which of said systems the use and control of said new extension or new subway shall belong.

Provided, however, that the right of said Arbitral Board to assign the use and control of said new extension or new subway to the Lessee shall not affect or impair, nor be affected or impaired by, the obligation hereinafter imposed upon the Lessee to return the Lessor's road without break of continuity or connection.

APPENDIX F.

EXTRACT FROM REPORT OF JOINT BOARD TO THE LEGISLATURE, JAN. 10, 1910, (SENATE DOCUMENT, NO. 22).

The second part of the reference is as to whether it is advisable, expedient and in the public interest to change the terms and conditions of the first and second preferred stock to be issued by the Boston Elevated Railway Company, and if so, in what manner and to what extent.

The resolve in which this reference is contained was approved May 14, 1909. By an act approved May 13, 1909,— the act and the resolve therefore being practically contemporaneous,— section 15 of chapter 551 of the Acts of the year 1908 was amended so that the time granted by that act to the Boston Elevated Railway Company and the West End to effect the consolidation therein provided for was extended one year, or to the 31st of December, 1910.

Taking the dates of the act and of the resolve into consideration, and also the terms of the reference, this Joint Board understands that it was not the intention of the Legislature to refer to it the question whether the first and second preferred stock ought to be issued on terms less favorable than those set forth in the act, but simply whether amended terms more favorable to the West End Street Railway stockholders, as urged in their behalf, ought to be granted.

The 8 per cent. rate for the first preferred stock, which stock is to be issued in exchange for preferred stock of the West End Street Railway, is determined by St. 1887, c. 413, § 2, which for certain purposes authorized the West End Street Railway Company to issue from time to time, to an amount not exceeding $6,400,000, its preferred stock, having preference and priority over the common and all other stock of the corporation forever, and being entitled to semi-annual cumulative dividends, to be

paid out of the net profits of the corporation, not exceeding 8 per cent. per annum, but not entitled to participate in any increase or issue of new stock, common or preferred.

So far as the common stock of the West End Street Railway is concerned, the Legislature up to the time of the passage of St. 1908, c. 551, had entered upon no similar obligation.

One amendment of the act of 1908 which is asked for in behalf of stockholders of the West End Street Railway Company is that the second preferred stock of the Boston Elevated Railway Company, to be issued upon consolidation in exchange for the common stock of the West End Street Railway, shall be an 8 per cent. instead of a 7 per cent. stock.

The lease of the franchise and property of the West End Street Railway Company to the Boston Elevated Railway Company, which was under consideration by the Board of Railroad Commissioners in 1897, provided for a term of ninety-nine years and a payment as rental of 8 per cent. both on the preferred and the common stock. In that case the Railroad Commissioners determined that such a lease would be wholly discordant with the public policy deliberately settled and wisely restricted by the Legislature; that the rental charge was unwarranted, and involved an unreasonable and excessive public burden, especially in view of the length of the stipulated term; and that such a lease was not consistent with the public interest nor in accordance with the public policy declared by the General Court.

As a result of this determination, the provisions of the lease were altered, limiting the term to twenty-four years and a fraction, and the payment on account of the common stock to 7 per cent. per annum.

It is now urged that in the consolidation this rate of 7 per cent. should be changed to 8 per cent., not for a specified number of years, but without limit as to time. In this respect, therefore, the proposition is more objectionable than was that submitted in 1897.

In our opinion, if the consolidation is effected under the provisions of the act of 1908, the stockholders of the West End Street Railway Company, by reason of the assurance for the future of preferred cumulative dividends of 7 per cent., will hold after the year 1922, when the present lease expires, a security safer and more permanently valuable than that which they had prior to the execution of the present lease, or than that which, in case consolidation is not effected, they after 1922 will hold, obliged as they then will be to begin anew the operation of their railway in competition with another company seeking business in the same metropolitan district.

It has been suggested that the provisions of the existing lease relating to its termination are such as to place the West End Street Railway Company at that time in a commanding position. It must not be forgotten that the Legislature is the ultimate controller of the situation.

The two companies agree that it is the interest of the public that a consolidation should take place, and that material economies can be effected thereby. In this view this Joint Board concurs.

The terms of the consolidation should be such as are just to each of the parties. No undue advantage should be granted to either of them. This Joint Board considers that the rate of dividend on the second preferred stock, as named in the act, is not unjust to the West End Street Railway stockholders, but, on the contrary, is amply liberal.

APPENDIX G.

AN ACT AMENDING AN ACT TO AUTHORIZE THE CONSOLIDATION OF PROPERTIES AND FRANCHISES OF THE BOSTON ELEVATED RAILWAY COMPANY AND THE WEST END STREET RAILWAY COMPANY.

Be it enacted, etc., as follows:

1 SECTION 1. Section two of chapter five hundred and fifty-one of
2 the acts of the year nineteen hundred and eight is hereby amended by

inserting after the words "outstanding at the date of purchase", where these words appear the third time in said section, the words: — No other stock shall hereafter be issued, either preferred or equal to such first preferred or second preferred stock, without the consent of two-thirds of the holders of such stocks respectively, — so that said section shall read as follows: — *Section 2.* For the purpose above mentioned the Boston Elevated Railway Company is authorized to increase its capital stock by an amount equal at par to the par value of the capital stock of the West End Street Railway Company outstanding at the time of purchase. Such new stock shall consist of shares of the par value of one hundred dollars each, and shall be divided into first preferred stock and second preferred stock, the par value of the first preferred stock to be equal to the par value of the first preferred stock of the West End Street Railway Company outstanding at the date of purchase, and the par value of the second preferred stock to be equal to the par value of the common stock of the West End Street Railway Company outstanding at the date of purchase. No other stock shall hereafter be issued, either preferred or equal to such first preferred or second preferred stock, without the consent of two-thirds of the holders of such stocks respectively. The first preferred stock shall be forever entitled in preference and priority over all other stock of said corporation to semi-annual dividends to be paid out of the net profits of the corporation on the first days of January and July in each year at the rate of eight per cent per annum and no more, which dividends shall be cumulative. The second preferred stock shall be forever entitled in preference and priority over all other stock of said corporation, except said first preferred stock, to semi-annual dividends to be paid out of the net profits of the corporation on the first days of April and October in each year, at the rate of seven per cent per annum, and no more, which dividends shall be cumulative. In case of dissolution or liquidation the holders of said first preferred and second preferred stock shall be entitled to the payment of the par value of their shares and all accrued and unpaid dividends before any payment is made to the holders of common shares, and the remainder of the assets of the corporation shall be distributed among the holders of the common stock. Said first and second preferred stock shall have the same power of voting and transfer as said common stock, and shall be counted with said common stock in all questions of majorities and quorums, but said first preferred stock shall not be entitled to participate in any increase or issue of new stock, common or preferred, which may at any time be made by said corporation. Dividends on said first and second preferred stock shall accrue from the dates of the last payment of dividends prior to such purchase on the preferred and common stock respectively of the West End Street Railway Company.

SECTION 2. Section fourteen of said chapter five hundred and fifty-one is hereby amended by striking out the words "two-thirds" wherever they appear in said section, and inserting in place thereof the words: — a majority, — so that said section shall read as follows:— *Section 14.* The purchase and sale herein authorized shall not be made until the terms thereof shall have been approved by the board of railroad commissioners in accordance with the provisions of section sixty-seven of Part I. of chapter four hundred and sixty-three of the acts of the year nineteen hundred and six, nor until such purchase and sale shall have been authorized by the holders of not less than a majority in amount of the capital stock of the Boston Elevated Railway Company and not less than a majority in amount of the capital stock of the West End Street Railway Company given at special meetings called for that purpose.

SECTION 3. Section fifteen of said chapter five hundred and fifty-one, as amended by chapter three hundred and eighty-three of the acts of the year nineteen hundred and nine, is hereby amended by striking out the word "ten," in the third line, and inserting in the place thereof

the word: — eleven,— so that said section shall read as follows: — *Section 15.* Unless the purchase and sale herein authorized are effected on or before December thirty-first, nineteen hundred and eleven, all authority hereunder to make the same shall cease: *provided,* that if such purchase and sale are delayed by litigation either the Boston Elevated Railway Company or the West End Street Railway Company may apply to the said board for an extension of the time therefor, and the board after notice and a public hearing and upon proof that such litigation is not collusive may from time to time determine what extension of time may reasonably be allowed for completing such purchase and sale, and such further time shall thereupon be allowed therefor.

SECTION 4. This act shall take effect upon its passage.

APPENDIX I.

[CHAPTER 38.]

RESOLVE TO PROVIDE FOR AN INVESTIGATION RELATIVE TO THE CONSTRUCTION OF A TEAMING TUNNEL UNDER BOSTON HARBOR TO EAST BOSTON.

Resolved, That the board of railroad commissioners and the Boston transit commission, acting as a joint board, shall investigate the subject-matter of the petitions of Thomas J. Giblin and others, with accompanying bill, house, number seven hundred and twenty-one, to provide for the construction of a teaming tunnel under Boston harbor to East Boston, and shall report to the general court not later than May fifteenth, nineteen hundred and eleven. Said joint board may expend a sum not exceeding five hundred dollars in carrying out the provisions of this resolve, to be paid out of the treasury of the commonwealth. [*Approved March 28, 1911.*

APPENDIX J.

THE COMMONWEALTH OF MASSACHUSETTS.

To the Honorable Senate and House of Representatives:

Chapter 38 of the Resolves of the year 1911 reads as follows:

RESOLVE TO PROVIDE FOR AN INVESTIGATION RELATIVE TO THE CONSTRUCTION OF A TEAMING TUNNEL UNDER BOSTON HARBOR TO EAST BOSTON.

Resolved, That the board of railroad commissioners and the Boston transit commission, acting as a joint board, shall investigate the subject-matter of the petitions of Thomas J. Giblin and others, with accompanying bill, house, number seven hundred and twenty-one, to provide for the construction of a teaming tunnel under Boston harbor to East Boston, and shall report to the general court not later than May fifteenth, nineteen hundred and eleven. Said joint board may expend a sum not exceeding five hundred dollars in carrying out the provisions of this resolve, to be paid out of the treasury of the commonwealth. [*Approved March 28, 1911.*

The petition referred to in the foregoing resolve is in the following form:—

The undersigned citizens of Massachusetts respectfully petition for the passage of an act authorizing or requiring the city of Boston to construct a teaming tunnel between Boston and East Boston substantially as set forth in the accompanying act.

The draft of the act referred to is printed as House Document No. 721.

Under an act to provide for an investigation of the congestion of traffic in the streets of the city of Boston (Statutes, 1907, chapter 247), the Boston transit commission, on January 10, 1908, made a report which contained the following special reference to the matter of a teaming tunnel to East Boston:—

Studies have been made with reference to the possibility of constructing a teaming tunnel to East Boston. Such a tunnel might be located on the present North ferry route, or from the present South ferry on the Boston side to the North ferry in East Boston.

Designs and estimates have been made for such a tunnel, to accommodate two lines of teams with a narrow sidewalk on each side. If such a tunnel were placed with its crown 45 feet below mean low water at harbor commissioners' line, the roadway would be 75 or 80 feet below Atlantic Avenue; and to approach such a tunnel by an incline, would require a length of 4,000 feet with a 2 per cent. grade, or 2,000 feet with a 4 per cent. grade; the latter, however, would be too long and steep for heavy teams. If the grade were 3 per cent., the length of the incline would be 2,600 feet, which would bring the entrance to the tunnel so far away that it would be of little use. The only other arrangement for entrance to a teaming tunnel would be by elevators. Such a tunnel has been built under the river in Glasgow. An elevator service similar to that at Glasgow (see Appendix B) would have a capacity of approximately 4,000 teams per day of twelve hours, provided eight elevators could be used at each end. An escalator such as that which has been built in Cleveland would handle a larger number.

Our engineers have estimated that the cost, exclusive of land damages, of constructing such a tunnel located on the present North ferry route, with elevators and other equipment, the length being about 2,250 feet, would be about $1,600,000, and the annual cost of operation, including interest at 4 per cent., would be about $150,000.

Taking an alternative route from the South ferry on the Boston side to the North ferry on the East Boston side, with a length of 2,800 feet, the total estimated cost, exclusive of land damages, is about $1,750,000, with an annual cost for maintenance of $155,000.

Details of the traffic over, and cost of operation of, the East Boston ferries will be found in Appendix C.

Such a tunnel would be subject to blockades. The use of the elevators and the passage through the tunnel, which would be measured by the speed of the slowest teams, would upon an average, take as much time as is now taken for the ferry service. If a toll were charged, the teamsters would probably prefer the ferry service except in severe and foggy weather. It seems quite unlikely that the construction of such a tunnel would justify the discontinuance of one of the present ferries.

Appendix B, above referred to, is as follows:—

GLASGOW HARBOR TUNNEL.

The Glasgow harbor tunnel is a tunnel under the river for the use of teams, with elevators at each end. It consists of three circular tubes, two for vehicles and one for passengers, entering the central shaft at each end. The section of each tube is circular and 16 feet in diameter, allowing the passage of one team. The finished diameter of the shaft is 76 feet, and the bottoms of the shafts are about 75 feet below street level. In each shaft there are six elevators, three for elevating and three for lowering, operated by hydraulic pressure, at 750 pounds per square inch. The toll is one-quarter penny per passenger, threepence for loaded teams and twopence for unloaded teams, the annual revenue from passengers being $8,500, and from teams about the same. The total cost of installation was about $1,450,000. The weekly wages amount to a little less than $200. The elevators are capable of handling at each end 90 teams per hour each way, or about 1,000 teams each way per day of twelve hours.

This tunnel is a private enterprise, and is reported not in operation at present.

Information has lately been received that the operation of the Glasgow teaming tunnel has not been resumed.

The tunnel described in the draft of an act above referred to, namely, House Document No. 721 of the present year, corresponds with the tunnel upon which the estimates of the Boston transit commission were made in 1908. On a review of that report it appears that the statements therein made were well considered and sound, but the following matters in confirmation of the report may properly be referred to.

It is improbable that a sidewalk, no matter how ample, would be used to any material extent so long as conveyance by ferry costs only one cent per passenger. The demand for ferry service for foot passengers would still be imperative.

Even if no toll for the use of the tunnel by teams were imposed it is clear that a considerable percentage of the teaming traffic would prefer to pay the present low rate of toll and use the ferries.

For sledding in winter it will be necessary to provide snow or ice on the roadways.

Extreme precautions would be requisite to guard against disaster resulting from the burning of any combustible material in the teams passing through the tunnel. It seems probable that satisfactory precautions could be devised through arrangements for sprinkling and through restrictions as to the nature of the loads and their covering. It is evident that any fire in the tunnel would result in a catastrophe unless sufficient means should be taken to extinguish it at once and also to remove quickly from the tunnel any collection of smoke.

As stated in the report of the Boston transit commission the speed of all teams in a tunnel for only two lines of traffic would be limited to the speed of the slowest moving teams. This difficulty would be materially relieved if the tunnel should be built wide enough for three or four lines of traffic. The engineer of the Boston transit commission has estimated that a four-

way tunnel, with suitable appurtenances, but exclusive of land damages, would cost about $2,600,000.

This joint board is of opinion that the building of such a tunnel as has been suggested would not do away with the necessity of operating the ferries, and that under present teaming conditions, with large use of animal power, the construction of a teaming tunnel would be inadvisable. This matter may, however, properly be reviewed when mechanical power is more generally substituted for animal power since such substitution will do away with some of the existing obstacles to successful operation, and will render possible shorter and less expensive approaches with steeper grades.

Statistics will be found in the appendix.

By Order of the Joint Board,

GEORGE G. CROCKER,
Chairman.

MAY 13, 1911.

APPENDIX.

Figures are for 1910–11 unless otherwise stated.

Ferry Service — 7 Boats.

(Both Ferries.)

For the year ending January 31, 1911:

Total expenditures, regular and special appropriations,		$293,895 63
Total receipts:—		
From foot passengers,	$60,981 61	
From teams and passengers thereon,	42,659 50	
From head house privileges, rents, sale of old material, sale of tickets at office for ferry trips, etc.,	3,097 46	
		106,738 57
Deficit,		$187,157 06

Number of teams of all kinds carried during year:—

	North, 532,137.	South, 402,154.	Total, 934,291.
Average daily (365 days),	1,457	1,102	2,559
Average daily by months, including Sundays and holidays:—			
January,	1,374	812	2,186
February,	1,382	840	2,222
March,	1,431	991	2,422
April,	1,435	1,059	2,494
May,	1,473	1,133	2,606
June,	1,560	1,176	2,736
July,	1,597	1,153	2,750
August,	1,604	1,326	2,930
September,	1,553	1,263	2,816
October,	1,455	1,196	2,651
November,	1,426	1,156	2,582
December,	1,337	995	2,332

Of the average daily number of teams given above, 2,559, about 1,500 are carried during the 4 rush hours of the day, namely 7–9 A.M. and 5–7 P.M., leaving 1,059 to be handled during the rest of the day.

For the last 5 years, the average total receipts from teams and passengers thereon have been $42,000, or an average of about 4½ cents per team.

The following statement has been received from Frederic H. Fay, division engineer of the Bridge and Ferry Division, Public Works Department:—

Three boats are in continuous service at each of the East Boston ferries throughout the busy hours of the day, viz., at the North ferry from 7.30 A.M. to 6.30 P.M. and at the South ferry from 8 A.M. to 6.30 P.M. With our present slip capacity it would be possible to operate four boats at each ferry if we had the boats; but with weather conditions favorable I think the four boat service would give no better accommodations than the present three boat service, for owing to the greater delays in making and leaving the slips the four boats would probably not be able to make any more trips per hour than can be made by the three boats. In bad weather, however, when the drops are slippery, considerable time is lost in getting loaded teams ashore, these teams having to be hauled off singly by means of an electric motor; at such times four boats could be used at each ferry to advantage to maintain approximately the same trip schedules as are given by the three boat service under favorable conditions.

Cost of operation for the year ending Jan. 31, 1910, was . $222,101 10
This was distributed as follows:—

Employees,	$158,133 45
Fuel, teaming and wheeling coal, etc.,	33,424 79
Oil, waste, etc.,	7,061 92
Repairs of boats,	10,959 95
Repairs of drops, buildings,	5,798 89
Electric light,	3,412 57
Gas,	660 56
Printing,	988 02
Stationery, telephones, furnishings, etc.,	1,660 95
	$222,101 10

Traffic on both ferries Feb. 1–05 to Feb. 1–10:

	Feb. 1, 1905, to Feb. 1, 1906.	Feb. 1, 1906, to Feb. 1, 1907.	Feb. 1, 1907, to Feb. 1, 1908.	Feb. 1, 1908, to Feb. 1, 1909.	Feb. 1, 1909, to Feb. 1, 1910.
One horse teams,	626,518	634,839	608,744	612,167	625,723
Two-horse teams,	225,361	225,024	238,911	214,572	245,131
Three-horse teams,	9,169	10,409	8,091	8,262	11,929
Four-horse teams,	11,678	11,547	16,897	11,488	9,257
Two-horse carriages and hacks,	21,728	18,571	26,381	30,720	36,667
Two-cent tolls for handcarts, etc.,	4,518	4,936	5,251	5,058	5,934
Dragwheels, etc.,	88	41	23	29	12
Total teams on both ferries,	899,060	905,367	904,298	882,296	934,653

Of the total for the year ending Feb. 1–10, 934,653, the North ferry handled 555,941 and the South ferry 378,712.

STATISTICS OF BUSINESS OF THE CITY FERRIES BETWEEN BOSTON AND EAST BOSTON.

	1901-02.	1902-03.	1903-04.	1904-05.	1905-06.	1906-07.	1907-08.	1908-09.	1909-10.	1910-11.
Passengers per annum,	12,395,649	12,923,734	13,213,559	13,200,033	6,708,152	6,292,393	6,353,101	6,385,697	6,352,461	6,313,696
Teams per annum,	930,928	938,097	921,068	952,509	899,060	905,367	904,298	882,296	934,653	934,291
Total receipts from foot passengers,	$121,687	$126,928	$131,621	$129,976	$65,228	$61,016	$61,790	$62,122	$62,054	$60,982
Total receipts from teams and passengers thereon,	43,102	43,189	44,426	44,003	41,844	42,393	42,636	41,063	43,649	42,660
Total receipts turned over to City Collector (rents included).	167,880	173,190	177,507	176,149	108,478	104,803	105,665	104,244	107,332	106,739
Total expenditures (regular and special appropriations, but excluding accounts transferred).	290,742	296,979	295,869	258,126	273,715	290,464	294,358	249,068	222,101	293,896
Difference of last two items,	122,862	123,789	118,362	81,977	165,237	185,661	188,693	144,824	114,769	187,157
Net capital investment by the city,	3,198,988	3,337,780	3,473,086	3,571,934	3,754,091	3,957,516	4,154,092	4,316,806	4,449,509	4,636,667

1910–11 receipts, North ferry:—		
Foot passengers,	$35,585 00	
Teams,	22,894 00	
		$58,479 00
1910–11 receipts, South ferry:—		
Foot passengers,	$26,867 00	
Teams,	18,293 00	
		$45,160 00

The following statement is furnished by the Bridge and Ferry Division of the Public Works Department:—

The number of ferryboats is seven; the number in commission is six, with three at each ferry.

Their team carrying capacity is
Three propeller boats, average 13 each when loaded properly.
One side-wheeler, average 14 when loaded properly.
Three side-wheelers, average 12 each when loaded properly.

The running time and number of trips are
North ferry — week days — conditions favorable:—

12 midnight to 5 A.M., one boat,	20 minute trips.
5 A.M to 6 A.M., one boat,	15 minute trips.
6 A.M. to 7.30 A.M., two boats,	8 minute trips.
7.30 A.M. to 6.30 P.M., three boats,	6 minute trips.
6.30 P.M. to 7 P.M., two boats,	8 minute trips.
7 P.M. to 12 midnight, one boat,	15 minute trips.

Sundays:—

12 midnight to 5 A.M., one boat,	20 minute trips.
5 A.M. to 11 A.M., one boat,	15 minute trips.
11 A.M. to 7 P.M., two boats,	8 minute trips.
7 P.M. to 12 midnight, one boat,	15 minute trips.

South ferry — week days — conditions favorable:—

*10 P.M. to 6 A.M., ferry closed.	
6 A.M. to 8 A.M., two boats,	11 minute trips.
8 A.M. to 6.30 P.M., three boats,	8 minute trips.
6.30 P.M. to 7.30 P.M., two boats,	11 minute trips.
7.30 P.M. to 10 P.M., one boat,	19 minute trips.

Sundays, 6 A.M. to 10 P.M., one boat, 18 to 20 minute trips.

The length of time in crossing harbor from time boat is unhooked till hooked is about four minutes on the North ferry and about five on the south.

* Saturdays excepted; 10 P.M. to 12 Midnight, one boat 19 minute trips.

APPENDIX K.

THE COMMONWEALTH OF MASSACHUSETTS.

To the House of Representatives of the Commonwealth of Massachusetts:

On January 17, 1911, the House of Representatives ordered

"That the Board of Railroad Commissioners and the Boston Transit Commission, sitting jointly, investigate forthwith the transit facilites of the town of Revere, the city of Chelsea and the town of Winthrop, particularly with reference to the relations of these municipalities to the transit system of Greater Boston; and that the results of this investigation be reported to the House of Representatives on or before March 15, 1911, with such recommendations as are advisable or necessary to secure to these three municipalities the transit advantages in street railway service enjoyed by other sections of Greater Boston for a five cent fare."

In pursuance of this legislative reference, the Board of Railroad Commissioners and the Boston Transit Commission, sitting jointly, duly organized and proceeded in the investigation directed by the House of Representatives, and now make report thereon, with such recommendations as are within the terms of the order.

The Boston Elevated Railway Company and the Boston and Northern Street Railway Company operate connecting lines of railway in the city of Chelsea. The Boston and Northern Street Railway Company also operates a railway in the adjoining town of Revere. The Point Shirley Street Railway Company operates a line of railway in the town of Winthrop, having no point of physical connection with any other street railway.

In addition to the street railway service in this territory, the Boston and Maine Railroad and the Boston, Revere Beach and Lynn Railroad Company operate steam railroad lines, and proposals for additional transportation lines are before the General Court.

So far as Chelsea and Revere are concerned, street railway connections with Boston proper are obtained through the East Boston tunnel and by surface lines via Charlestown, making connections with the rapid transit system of Boston at State street, City square and other points.

Statutes 1897, chapter 500, section 10, secures to the public for a fare not exceeding five cents a single continuous passage in the same general direction upon all lines owned, leased, or operated by the Boston Elevated Railway Company; but by reason of the fact that the service of this company does not cover the whole of the territory above mentioned, the residents of Revere and of a large portion of the city of Chelsea are not on an equality with the residents of other areas in the vicinity of Boston served exclusively by the Boston Elevated Railway Company. The five cent fare for a single ride in the same general direction in other districts near Boston is the result of combinations of several lines into one system, thereby affording the residents of those districts the advantages of a consolidated company.

The desired transit facilities for Chelsea and Revere may be secured in several ways.

First. An act may be passed of similar import to chapter 388 of the Acts of 1902, entitled "An Act to authorize the Old Colony Street Railway Company to lease to the Boston Elevated Railway Company or to the

West End Street Railway Company any part of its railway and property located in the city of Boston." By authority of this legislation the Old Colony Street Railway Company leased to the Boston Elevated Railway Company a portion of its railway within the city of Boston to a point of connection with the Boston Elevated Railway, and thus under the statute of 1897 above referred to the facilities of the Boston Elevated Railway system were secured for a single fare to the residents of the area served by this portion of the Old Colony Street Railway. A bill embodying the same principle, but limited to the territory within the city of Chelsea, is now before the General Court. If such bill, amended to include the town of Revere, is enacted into law and the Boston Elevated Railway Company and the Boston and Northern Street Railway Company act thereunder, the desired facilities will be secured by the residents of the districts included within its terms.

Second. The Board of Railroad Commissioners and the Boston Transit Commission, sitting jointly, under chapter 139 of the Resolves of 1910, has reported a draft of an act "to authorize the Boston Elevated Railway Company to purchase and hold the stock and bonds of and to consolidate with certain other street railway companies." Section 5 of this draft provides that the five cent fare upon the Boston Elevated Railway shall be extended so as to include within a distance of five and one-half miles from the State House the road of any street railway company thirty-five per cent. of the stock of which is acquired under the provisions of the act. The enactment of this legislation if followed by the requisite action taken by the companies affected would secure a five cent fare to all parts of Chelsea and substantially all of the town of Revere.

Third. Statutes 1897, chapter 500, section 10, to which reference has been made, gives to the Boston Elevated Railway Company, subject to certain provisos which in this connection are not important, the right for twenty-five years to collect a five cent fare for a single continuous passage in the same general direction upon lines owned, leased, or operated by it. This provision being of a contractual character cannot be modified by the legislature except with the consent of the company; but if modified, the company consenting thereto, passage for a five cent fare over the lines of both the Boston Elevated Railway and the Boston and Northern Street Railway would be secured for Chelsea and Revere provided the two companies should be willing to make some suitable traffic arrangement therefor.

The carrying-out of one of the foregoing methods would appear to be "necessary" to secure to Chelsea and Revere "the transit advantages in street railway service enjoyed by other sections of greater Boston for a five cent fare." The first method appears to be the most feasible at this time.

The town of Winthrop is not included in the foregoing discussion and recommendation. That town is now served in part by a street railway which has no physical connection with the lines of any other company. The Point Shirley Street Railway is only about a mile in length, is operated by gasolene power, and was constructed solely for local travel. One of its termini is located near a station of the Boston, Revere Beach and Lynn Railroad, which is the only other railroad or street railway in Winthrop. In order to secure to the town of Winthrop "the transit advantages in street railway service enjoyed by other sections of greater Boston for a five cent fare," the following methods are suggested.

A. If either the first or second suggestion set forth above should be carried out, it would be possible to extend the lines of the Boston Elevated Railway from Orient Heights in East Boston into and through the town of Winthrop, making a loop line connecting with the present Boston and Northern tracks at, or near, Beachmont.

B. In case neither of said suggestions is adopted, an extension of the line of the Boston Elevated Railway could be made from Orient Heights into and through Winthrop with return to Orient Heights by the same line or by a loop.

In dealing with the questions presented in the order under which this report is made, it must be borne in mind that under said section 10 of chapter 500 of the Acts of 1897, no "burden, duty, or obligation which is not at the same time imposed by general law on all street railway companies" can be imposed upon the Boston Elevated Railway Company without its consent during the period of twenty-five years from and after the passage of that act.

The foregoing is respectfully submitted.

By order of

THE BOARD OF RAILROAD COMMISSIONERS AND THE BOSTON TRANSIT COMMISSION, SITTING JOINTLY.

W. P. HALL,
Chairman of the Joint Board.

20 BEACON STREET, BOSTON, MASS., March 14, 1911.

APPENDIX L.

[CHAPTER 108.]

RESOLVE TO PROVIDE FOR AN INVESTIGATION AS TO CERTAIN IMPROVEMENTS OF THE SUBWAY AND TRANSPORTATION SYSTEM IN THE CITY OF BOSTON.

Resolved, That the board of railroad commissioners and the Boston transit commission, sitting jointly, be instructed to consider the matters contained in the following bills and resolve now pending, namely,— house bill, No. 149, house bill, No. 1384, house bill, No. 1385, and resolve, house, No. 1110. The said joint board shall investigate and determine whether it is for the public interest, and expedient, to enact any or all of the legislation prayed for in the petitions accompanying the said bills and resolve; and if the board recommends any legislation it shall submit the draft of an act or acts embodying the same. The said joint board shall report to the next general court on or before the second Saturday in January, and may expend for the purposes of this resolve such sums of money, to be paid out of the treasury of the commonwealth, as may be necessary, and as shall be approved by the governor and council. [*Approved June 22, 1911.*

APPENDIX M.

[CHAPTER 623.]

AN ACT TO EXTEND THE TERM OF OFFICE AND TO DEFINE THE DUTIES OF THE MEMBERS OF THE BOSTON TRANSIT COMMISSION.

Be it enacted, etc., as follows:

SECTION 1. The term of office of the members of the Boston transit commission is hereby extended for three years from the first day of July in the year nineteen hundred and eleven.

SECTION 2. The powers, duties and compensation of said commission during said term of three years shall be the same as are specified in chapter five hundred and forty-eight of the acts of the year eighteen hundred and ninety-four and in acts in amendment thereof or in addition thereto, except as hereinafter provided. Any vacancy in said commission shall be filled in the manner provided in said chapter five hundred and forty-eight.

SECTION 3. This act shall take effect upon its passage. [*Approved June 30, 1911.*

APPENDIX N.

The names of all the assistants in the Engineering Department who have been employed for more than one month during the last year together with an indication of the work on which they have been engaged, are given below.

Assistant Engineers.

CHARLES H. BARTLETT,	Detail work for steel structures.
C. LEONARD BROWN,	Inspection of construction, Sections 1 and 2 of tunnel under Beacon Hill.
WILBUR W. DAVIS,	Lines, grades and estimates for Section 1 to September, 1910, and since then in charge of construction, Section 2.
G. DANA EMERSON,	In charge of construction of Section 1.
JAMES B. FLAWS,	Inspection, Section 1 to September, 1910; lines and grades, Section 2.
JAMES T. FRAME,	Studies for Riverbank Subway and inspection of construction, Section 2.
LEONARD B. HOWE, WILLIAM W. LEWIS, ROY M. LOTHROP,	Studies, preliminary estimates, designs for structures, and detail plans.
LAURENCE B. MANLEY,	Studies and surveys for Riverbank Subway. Also in charge of pipe changes.
GEORGE H. STEARNS,	In charge of designs for steel work and reinforced concrete structures.
PHILIP B. WALKER,	Inspection, Sections 1 and 2; also in charge of repair work in East Boston Tunnel.

Draughtsmen.

GEORGE P. GOODMAN,	Photography and plans for tunnel work and structures.
* PETER L. DILLON, EDMUND A. RICE, * GEORGE E. RUSSELL,	Plans for steel work.
FREDERIC W. STILES,	Draughting and miscellaneous office work.

Transitmen.

HENRY N. HAYWARD,	Inspection, Section 1, and line and grade work, Sections 1 and 2.
THOMAS R. HAZELUM,	Inspection, Sections 1 and 2.
* LEROY P. HENDERSON,	Inspection, Section 2.
ARTHUR V. LYNCH,	Lines and grades, Sections 1 and 2.
ROBERT K. TAYLOR,	Inspection, Sections 1 and 2.
SIDNEY S. VONLOESECKE,	Line and grade work, Sections 1 and 2.

*Left the employ of the Commission.

Rodmen.

* ARTHUR B. APPLETON,	Force accounts, Section 2.
* HAROLD K. BRIDGMAN,	Line and grade work, Sections 1 and 2.
ARTHUR G. C. CHAPMAN,	Inspection, Sections 1 and 2.
* JOHN F. CALLAHAN, JR.,	Force accounts and inspection, Sections 1 and 2.
* MICHAEL A. COPLAN,	Line and grade work, Section 2.
* JOHN J. DEVLIN,	Inspection, Section 2.
AUSTIN B. HENDERSON,	Line and grade work, Sections 1 and 2; draughting.
* WARREN H. HUNTSMAN,	Inspection of concrete mixing for Sections 1 and 2.
THOMAS H. KEENAN,	Line and grade work and inspection, Sections 1 and 2.
JAMES J. TOBIN,	Inspection and force accounts, Section 2.
* JOSEPH E. MCDERMOTT,	Inspection of concrete mixing for Section 2.
* ADOLF K. VOLLMER,	Inspection of mixing of concrete for Section 2.
GEORGE W. PRESBY,	Inspector of concrete mixing, Section 2.

Chemist and Inspector of Material.

HAROLD C. DELONG,	Testing cement, pitch and other material; also superintending making of concrete sheeting, etc.
ALFRED W. PARKER,	Inspection of steel work.

Clerical Force.

ARTHUR B. CARTER,	Secretary and executive clerk to the chief engineer.
ROSE A. MCMAHON,	Stenographer.
JOHN E. RYAN,	Stenographer.
JOSEPH P. SHEERIN,	Messenger at main office; force accounts and miscellaneous work at field offices at 63 Phillips street and on Boston Common.
CHARLES E. FAY,	Messenger in draughting room; blueprinting; care of plans.

*Left the employ of the Commission.

APPENDIX O.

CANVASS OF BIDS FOR 25,000 POUNDS OF BUILT-UP STEEL POSTS FOR A PART OF SECTION 2, CAMBRIDGE CONNECTION.—BIDS OPENED AUGUST 2, 1910.

BIDDERS AND ADDRESSES.	Price per Pound (Cents).	Amount.	Time Required for Delivery.
F. A. Houdlette & Son, 93 Broad street, Boston..	4.1	$1,025.00	Three weeks.
G. W. & F. Smith Iron Co., Gerard street, Roxbury. .	4.00	1,000.00	Six weeks.
Eastern Steel Company, 110 State street, Boston..	3.45	862.50	Six to eight weeks.
W. E. Clark & Co., 120 Milk street, Boston..	3.4	850.00	Eight weeks.
Boston Bridge Works, 47 Winter street, Boston	3.3	825.00	Two months.
	Bethlehem, 3.14	785.00	
Chelmsford Foundry Co., Medford, Mass.....	3.3	825.00	Five weeks.
Montour Steel Company, Montour Falls, N. Y.....	3.15	787.50	Four weeks.
N. E. Bolt and Steel Co., Everett, Mass.....	3.15	787.50	
Lewis F. Shoemaker & Co., Philadelphia, Pa.....	2.95	737.50	Six to eight weeks.
Belmont Iron Works, Philadelphia, Pa.....	2.86	715.00	Six to eight weeks.
N. E. Structural Company, 110 State street, Boston..	2.75	687.50	Three weeks.
Bethlehem Steel Co., So. Bethlehem, Pa.....	2.38	595.00	Two months.

APPENDIX P.

Canvass of Bids for Construction, Section 2, Tunnel under Beacon Hill.— Bids Opened August 30, 1910.

Bidders and Addresses.	36,000 cubic yards earth excavation.	Removing and disposing of 350 cubic yards masonry walls, foundations, etc.	Furnishing, hauling and putting in place 10,000 cubic yards Portland concrete.	Furnishing and laying 20 cubic yards Portland cement brickwork.	Laying 500 linear feet 6-inch to 12-inch vitrified pipe.	Laying 150 linear feet 16-inch to 24-inch vitrified pipe.	Setting in place and securing 300 tons reinforcing rods and other steel weighing less than 6 pounds per linear foot.	Setting in place and securing 400 tons steel and iron weighing 6 pounds or more per linear foot.	Furnishing, preparing and applying to joints, etc., 1,200 square yards of coating, or skin, of Portland cement mortar, ½ inch thick.	Furnishing, preparing and applying 50 square yards waterproof coating, ½-inch thick.	Preparing and applying 30,000 square yards tarred felt or prepared textile, etc.	Underpinning and for supporting and protecting buildings and structures on line of work, etc.	Totals.
	a	b	c	d	e	ee	f	ff	g	h	i	k	
Metropolitan Contracting Company,	$7.50	$15.00	$14.00	$25.00	$2.00	$3.00	$20.00	$20.00	$0.50	$1.00	$0.50	.....	
95 Milk street, Boston, Mass.	270,000.00	5,250.00	140,000.00	500.00	1,000.00	450.00	6,000.00	8,000.00	600.00	50.00	15,000.00	$4,500.00	$451,350.00
John J. Falvey & Co.,	7.50	20.00	12.00	25.00	1.00	2.00	25.00	30.00	1.00	1.00	0.30	.....	
93 Journal Bldg., Boston, Mass.	270,000.00	7,000.00	120,000.00	500.00	500.00	300.00	7,500.00	12,000.00	1,200.00	50.00	9,000.00	7,800.00	435,850.00
John E. Palmer,	5.50	10.00	12.80	18.00	0.70	2.00	15.00	20.00	0.70	1.00	0.35	.....	
1012 Old South Bldg., Boston, Mass.	198,000.00	3,500.00	128,000.00	360.00	350.00	300.00	4,500.00	8,000.00	840.00	50.00	10,500.00	5,000.00	359,400.00
Coughlan & Sheils Company,	5.40	18.00	12.00	20.00	0.50	1.00	12.00	18.00	0.50	0.50	0.30	.....	
43 Tremont street, Boston, Mass.	194,400.00	6,300.00	120,000.00	400.00	250.00	150.00	3,600.00	7,200.00	600.00	25.00	9,000.00	6,000.00	347,925.00
Charles R. Gow Company,	5.00	18.00	13.50	18.00	0.50	1.00	12.00	15.00	0.50	1.00	0.20	.....	
79 Milk street, Boston, Mass.	180,000.00	6,300.00	135,000.00	360.00	250.00	150.00	3,600.00	6,000.00	600.00	50.00	6,000.00	5,000.00	343,310.00
Jones & Meehan,	5.00	15.00	12.00	20.00	1.00	2.00	15.00	20.00	0.30	0.50	0.30	.....	
10 Tremont street, Boston, Mass.	180,000.00	5,250.00	120,000.00	400.00	500.00	300.00	4,500.00	8,000.00	360.00	25.00	9,000.00	4,000.00	332,335.00
Luke D. Mullen,	4.95	18.00	10.50	20.00	1.00	2.00	15.00	20.00	0.50	1.00	0.30	.....	
161 Devonshire street, Boston, Mass.	178,200.00	6,300.00	105,000.00	400.00	500.00	300.00	4,500.00	8,000.00	600.00	50.00	9,000.00	15,000.00	327,850.00
Hugh Nawn Contracting Company,	4.50	10.00	11.00	18.00	0.50	1.00	8.00	12.00	0.50	2.00	0.25	.....	
82 Savin street, Roxbury, Mass.	162,000.00	3,500.00	110,000.00	360.00	250.00	150.00	2,400.00	4,800.00	600.00	100.00	7,500.00	5,000.00	296,660.00
Patrick McGovern,	4.65	10.00	10.00	20.00	0.50	1.00	12.00	12.00	0.25	0.50	0.25	.....	
6 Beacon street, Boston, Mass.	167,400.00	3,500.00	100,000.00	400.00	250.00	150.00	3,600.00	4,800.00	300.00	25.00	7,500.00	2,000.00	289,925.00
Coleman Brothers,	4.25	7.00	10.00	23.00	0.50	1.00	12.00	16.00	0.50	0.80	0.25	.....	
Chelsea, Mass.	153,000.00	2,450.00	100,000.00	460.00	250.00	150.00	3,600.00	6,400.00	600.00	40.00	7,500.00	7,000.00	281,450.00

APPENDIX Q.

CANVASS OF BIDS FOR 500,000 TO 600,000 POUNDS OF $\frac{7}{8}$-INCH SQUARE TWISTED OPEN HEARTH STEEL REINFORCING RODS. DELIVERED AT 75 CANAL STREET, BOSTON. BIDS OPENED AUGUST 30, 1910.

BIDDERS AND ADDRESSES.	Price per Pound (Cents).	Time of Delivery.
Mitchell & Tappan, 120 Liberty street, New York City	1.835	Delivery in three weeks.
Robert B. Campbell, 6 Beacon street, Boston	1.80	Delivery in six to ten weeks.
Lackawanna Steel Company, 8 Oliver street, Boston	1.73	Delivery in four to seven weeks.
Portland Iron and Steel Company, Board of Trade Bldg., Boston	1.72	200,000 pounds to be delivered by November 1, 1910. Balance to be delivered by December 1, 1910.
H. P. Converse & Co., 88 Broad street, Boston	1.71	Commence delivery in two to three weeks. Balance as soon as possible.
Jones & Laughlin Steel Company, 131 State street, Boston	*1.68	Shipment in two weeks.
H. W. Hayes & Co., 101 Tremont street, Boston	1.6725	Shipment to commence in three to four weeks.
W. E. Clark & Co., 120 Milk street, Boston	1.66	Delivery in four to ten weeks. Lackawanna rolling, Buffalo, N. Y.
Carnegie Steel Company, 125 Milk street, Boston	1.66	Complete shipment September 15 to 25, 1910.

* For purposes of comparison, teaming at 5 cents per 100 pounds has been added. Bid was f. o. b. cars Boston.

APPENDIX R.

CANVASS OF BIDS FOR 175,000 POUNDS OF STRUCTURAL STEEL FOR SECTION 2, TUNNEL UNDER BEACON HILL FOR CAMBRIDGE CONNECTION. BIDS OPENED SEPTEMBER 6, 1910.

BIDDERS AND ADDRESSES.	Price per Pound (Cents).	Total.	Time Named for Delivery.
F. A. Houdlette & Son, Inc., 93 Broad street, Boston.....	3.00	$5,250.00	Three weeks from date of contract.
Belmont Iron Works, Philadelphia, Pa.....	2.62	4,585.00	Two and one-half months from date of contract and necessary information to proceed.
W. E. Clark & Co., 120 Milk street, Boston.....	2.495	4,366.25	Ten weeks from receipt of full information and detail.
American Bridge Co., of New York, 141 Milk street, Boston.....	2.38	4,165.00	Three months from receipt of complete data.
Bethlehem Steel Company, South Bethlehem, Pa.....	2.23	3,902.50	Promptly as practicable. To be completed on or before October 30, 1910.

APPENDIX S.

Bids for Square Twisted Open-hearth Steel Rods 36 Feet Long, Delivered at Yard of the Boston Transit Commission, 75 Canal Street. February 16, 1911.

Bidder.	Size.	Pounds.	Price per Pound (Cents).	Amount.	Totals.	Time of Delivery.
Portland Iron and Steel Company	7/8 inch	80,000	1.73	$1,384.00		Delivery within six weeks from receipt of order.
	3/4 inch	15,000	1.73	259.50		
	5/8 inch	15,000	1.805	270.75		
					$1,914.25	
W. E. Clark & Co.	7/8 inch	80,000	1.685	$1,348.00		Shipment in one week to ten days after receipt of order.
	3/4 inch	15,000	1.685	252.75		
	5/8 inch	15,000	1.685	252.75		
					$1,853.50	
Lackawanna Steel Company	7/8 inch	80,000	1.61	$1,288.00		Delivery in three weeks from receipt of order.
	3/4 inch	15,000	1.61	241.50		
	5/8 inch	15,000	1.66	249.00		
					$1,778.50	
Jones & Laughlin Steel Company	7/8 inch	80,000	1.61	$1,288.00		Delivery in about four weeks.
	3/4 inch	15,000	1.61	241.50		
	5/8 inch	15,000	1.66	249.00		
					$1,778.50	
Carnegie Steel Company	7/8 inch	80,000	1.61	$1,288.00		Shipment in one week to ten days from receipt of order.
	3/4 inch	15,000	1.61	241.50		
	5/8 inch	15,000	1.66	249.00		
					$1,778.50	
A. Milne & Co.	7/8 inch	80,000	1.6049	$1,283.92		Delivery in three weeks after receipt of order.
	3/4 inch	15,000	1.6049	240.74		
	5/8 inch	15,000	1.6549	248.24		
					$1,772.90	
H. W. Hayes & Co.	7/8 inch	80,000	1.61	$1,288.00		Shipment from mill in ten days to two weeks.
	3/4 inch	15,000	1.61	241.50		
	5/8 inch	15,000	1.61	241.50		
					$1,771.00	

APPENDIX T.

Canvass of Bids for $\frac{7}{8}$-Inch Square Twisted Open-hearth Steel Reinforcing Bars Delivered at Canal Street Yard. May 2, 1911.

Bidders and Addresses.	Price per Pound (Cents).				Lengths (Feet).	Time of Delivery.
	10,000 Pounds.	20,000 Pounds.	40,000 Pounds.	60,000 Pounds.		
H. P. Converse & Co., 88 Broad street, Boston	2.25 =$225.00	2.25 =$450.00	2.25 =$900.00	2.25 = $1,350.00	36, 38 and 40	Immediately.
H. P. Converse & Co., 88 Broad street, Boston	1.65 = 165.00	1.65 = 330.00	1.65 = 660.00	1.65 = 990.00	36, 38 and 40	Indefinite, from mill.
Portland Iron & Steel Company, Board of Trade Bldg., Boston	1.66 = 166.00	1.66 = 332.00	1.63 = 652.00	1.63 = 978.00	32	Three weeks after receipt of order.
Robert B. Campbell, 6 Beacon street, Boston	1.6475= 164.75	1.6475= 329.50	1.6175= 647.00	1.6175= 970.50	32 or 36	Three weeks after receipt of order.
Jones & Laughlin Steel Company, 131 State street, Boston	1.6475= 164.75	1.6475= 329.50	1.6175= 647.00	1.6175= 970.50	5 or 10 ton lots 32 feet; 18 tons or over, 32 or 36 feet.	One week after receipt of order.
Lackawanna Steel Company, 8 Oliver street, Boston	1.64 = 164.00	1.64 = 328.00	1.61 = 644.00	1.61 = 966.00	32 or 36	During week of May 15.
Carnegie Steel Company, 120 Franklin street, Boston	1.64 = 164.00	1.64 = 328.00	1.61 = 644.00	1.61 = 966.00	.....	One week after receipt of order.
W. E. Clark & Co., 120 Milk street, Boston	1.64 = 164.00	1.64 = 328.00	1.609 = 643.60	1.609 = 965.40	32 or 36	One week after receipt of order.
A. Milne & Co., 8 Oliver street, Boston	1.64 = 164.00	1.64 = 328.00	1.605 = 642.00	1.605 = 963.00	32 or 36	Three weeks after order is placed.
H. W. Hayes & Co., 101 Tremont street, Boston	.....	.....	.....	1.6025= 961.50	32 or 36	About two weeks.

APPENDIX U.

Bids for Square Twisted Open-hearth Steel Rods 36 Feet Long, Delivered at Yard of the Boston Transit Commission, 75 Canal Street. June 6, 1911.

Bidder.	Size.	Pounds.	Price per Pound (Cents).	Amount.	Totals.	Time of Delivery.
A. C. Harvey Company	$\frac{7}{8}$ inch	150,000	1.48	$2,220.00		Two to three weeks.
	$\frac{3}{4}$ inch	10,000	1.48	148.00		
	$\frac{1}{2}$ inch	20,000	1.58	316.00		
					$2,684.00	
Jones & Laughlin Steel Company	$\frac{7}{8}$ inch	150,000	1.455	$2,182.50		One week from receipt of order.
	$\frac{3}{4}$ inch	10,000	1.455	145.50		
	$\frac{1}{2}$ inch	20,000	1.555	311.00		
					$2,639.00	
H. W. Hayes & Co	$\frac{7}{8}$ inch	150,000	1.4636	$2,195.40		Shipment to be arranged to the satisfaction of the Transit Commission.
	$\frac{3}{4}$ inch	10,000	1.4636	146.36		
	$\frac{1}{2}$ inch	20,000	1.4636	292.72		
					$2,634.48	
Carnegie Steel Company	$\frac{7}{8}$ inch	150,000	1.45	$2,175.00		Commence shipping immediately upon receipt of order at mills, completing within about two weeks or earlier.
	$\frac{3}{4}$ inch	10,000	1.45	145.00		
	$\frac{1}{2}$ inch	20,000	1.55	310.00		
					$2,630.00	
James W. Sederquist	$\frac{7}{8}$ inch	150,000	1.46	$2,190.00		If ordered immediately would start shipment from mill on or before June 20 and complete delivery during June.
	$\frac{3}{4}$ inch	10,000	1.46	146.00		
	$\frac{1}{2}$ inch	20,000	1.46	292.00		
					$2,628.00	

Contract awarded to Carnegie Steel Company on account of earlier delivery.

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